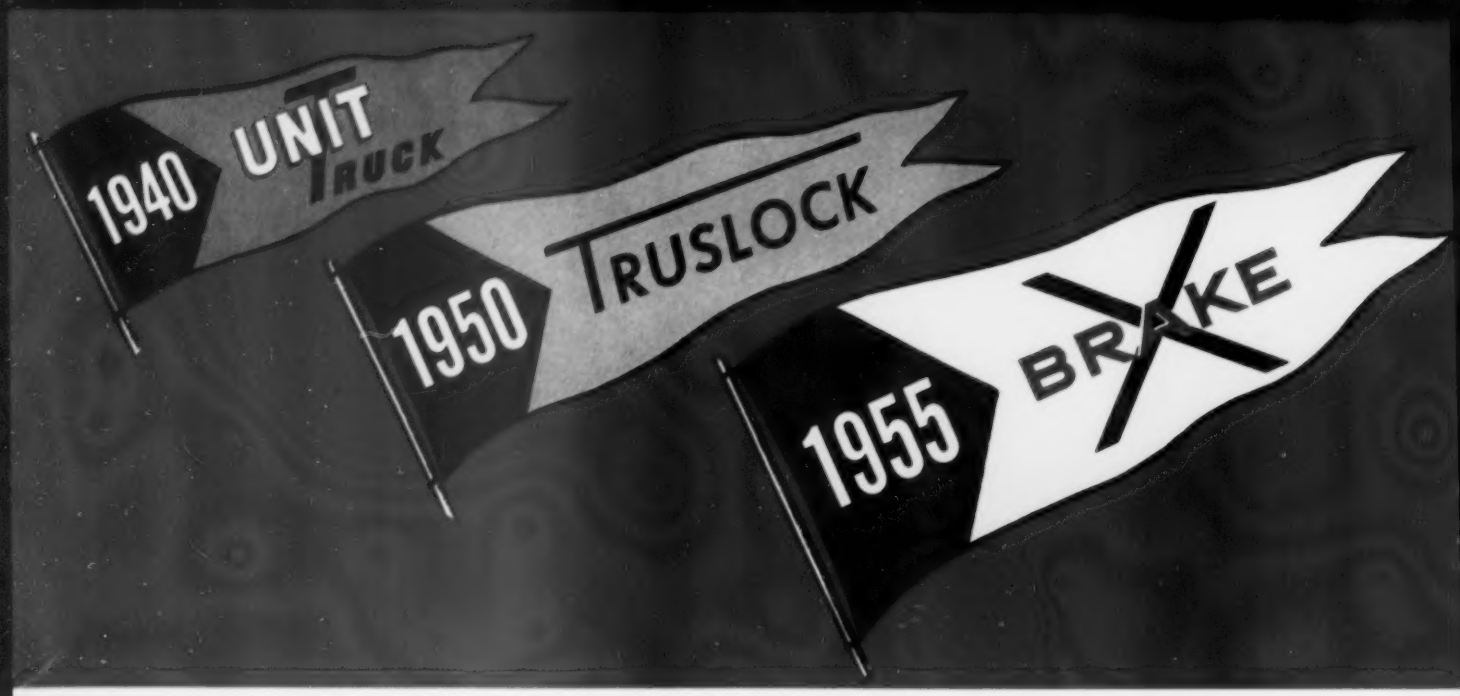
Founded in 1832

RAILWAY LOCOMOTIVES AND CARS

MAY 1956

One of Five Specialized Railway Age Publications



The THREE outstanding advances in the field of freight car braking are the products of a policy from which we have never deviated in more than half a century of building better brake rigging for AMERICAN freight cars . . . . . a steadfast determination to stick to the one thing we know best of all.

BUFFALO BRAKE BEAM CO. • UNIT TRUCK CORPORATION

The Atlantic Coast Line's crack units keep that "Just-Cleaned" look with Oakite Compound No. 88

By happy circumstance the perennial well-groomed appearance of The Atlantic Coast Line's crack units is entrusted to Oakite Compound No. 88 and for this important reason:

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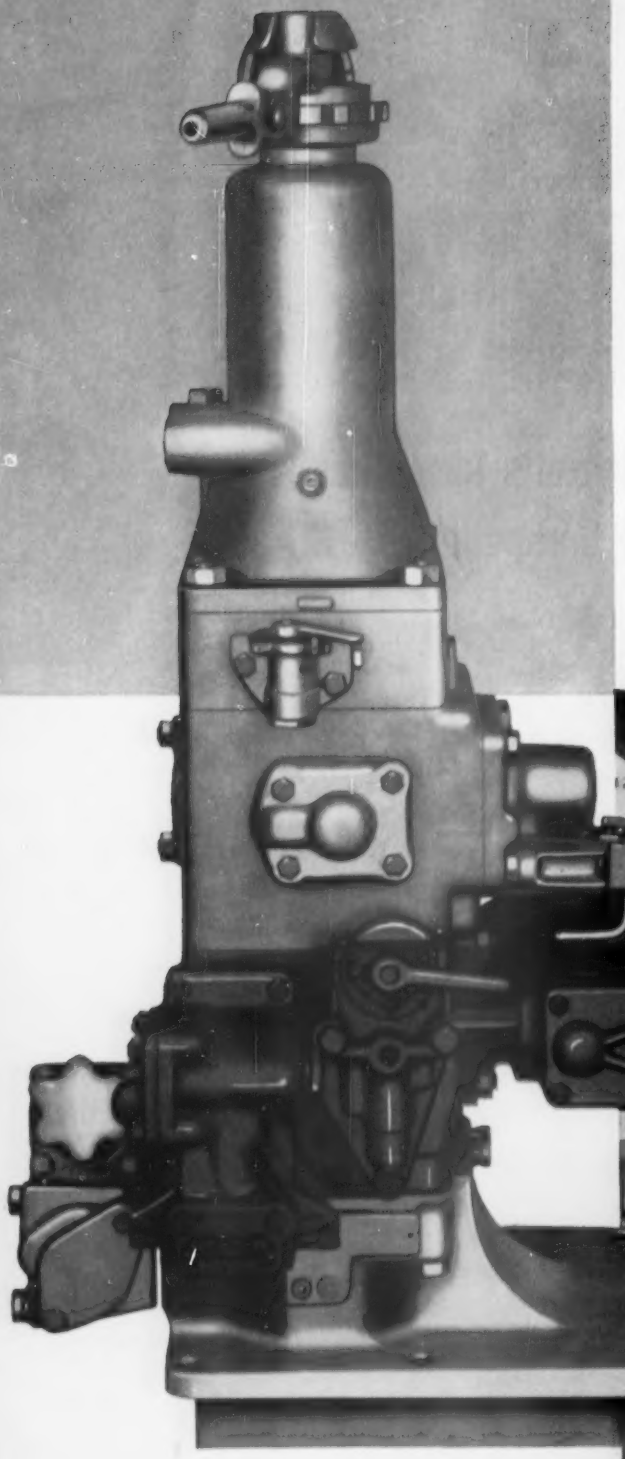
FREE Booklet F-8055 gives complete description of manual and mechanical exterior car-washing with Oakite Compound No. 88. The Oakite Railway Division Representative in your city will be glad to hand you a copy. Or write direct to Oakite Products, Inc., 46 Rector Street, New York 6, New York.

OAKITE

RAILWAY DIVISION

24RL—the road locomotive brake that can be kept modern



Sectional construction, as followed in the 24 RL Brake Valves, provides for the addition of new or improved functions merely by the substitution of sections. The advantage, of course, is that the brake equipment can be kept modern with minimum investment as compared to entire brake valve replacement.

The most recent improvement that can be provided in this manner is the brake pipe pressure maintaining feature, which offers pronounced improvement in train brake operation plus outstanding maintenance economies that develop from uniform distribution of braking pressure throughout the train.

This feature can be incorporated in any D-24 Type Brake Valve now in service by replacing the existing Filling Piece Portion with the Conversion Filling Piece shown in color in the illustration. Write for our Circular Notice No. 1130 which gives complete details.

Westinghouse Air Brake
COMPANY
AIR BRAKE DIVISION WILMERDING, PENNA.

PUBLISHED MONTHLY BY THE

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RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as the American Rail-Road Journal

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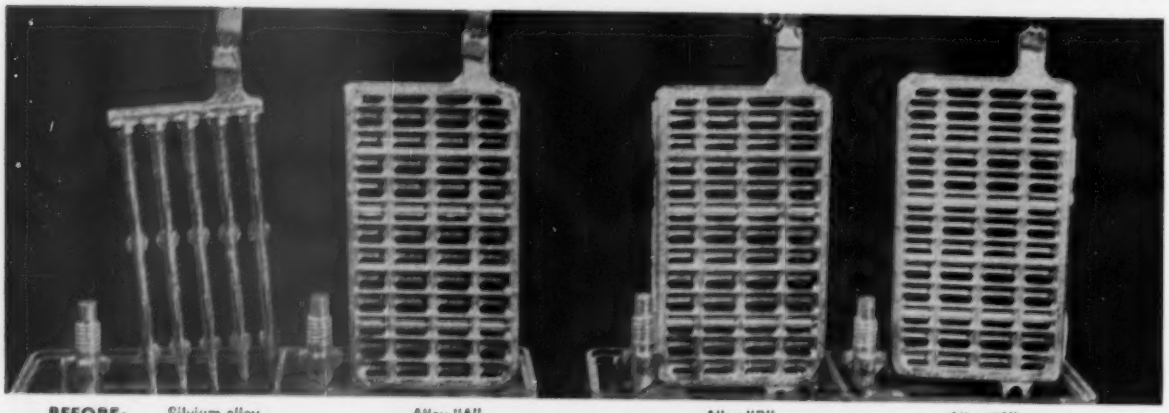
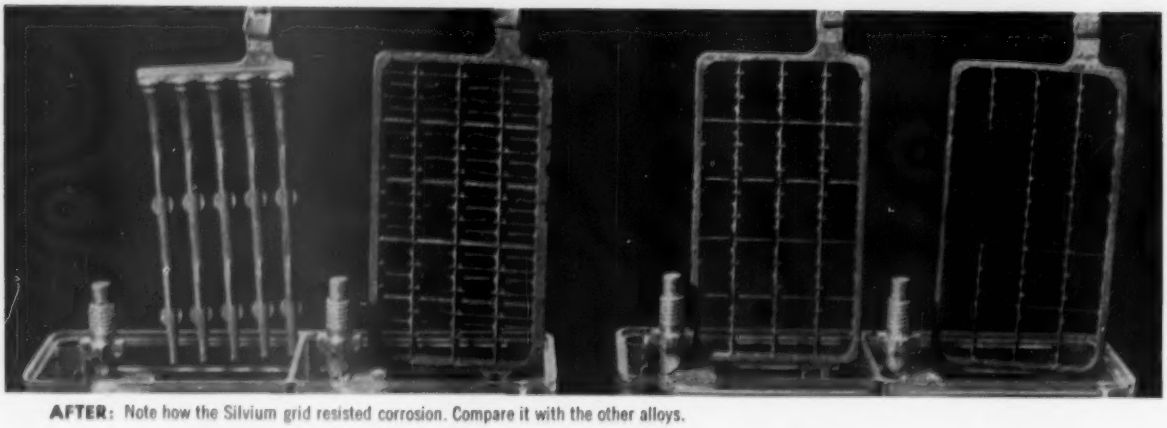
EXIDE-IRONCLAD BATTERIES

For railway carlighting and air conditioning



BEFORE: Silvium alloy — Alloy "A" — Alloy "B" — Alloy "C"



AFTER: Note how the Silvium grid resisted corrosion. Compare it with the other alloys.

Corrosion resistant SILVIUM prolongs battery life

BATTERY FOR RAILWAY CARLIGHTING AND AIR CONDITIONING. Model EHL. Tubular construction of positive plate especially important in preventing flaking of active material under constant vibration. Insures long life and ability to handle high peak loads. Write for Bulletin 5168.

Reaching down deep into every Exide-Ironclad Battery are the fingers of Silvium alloy metal which form the grids of the famous Exide-Ironclad positive plates.

Silvium is a special alloy developed by Exide to resist corrosion and thus prolong battery life. For proof, Exide research engineers compared the performance of an Ironclad Silvium grid side by side with ordinary grids of other lead alloys. As the photographs above show, only Silvium came through the test without damaging corrosion—undiminished in size, unimpaired in strength. The other grids showed from moderate to severe corrosion.

Tests have proved that Silvium is not only more resistant to corrosion, but also a better conductor of electricity. Hence it both prolongs battery life and —because there's less internal battery resistance—more readily permits heavy drafts of power.

This special material is only one of the many exclusive features which have made Exide-Ironclad Batteries world famous for high capacity and long life. When you order batteries for heavy duty applications, or the equipment requiring such batteries, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

Exide®

The MODERN Southern Pacific uses the MODERN Diesel lubricant

GULF DIESELMOTIVE

104 YEARS AGO a small wood-burning locomotive forged the first link in what is now the gigantic Southern Pacific transportation system. Today powerful Diesels thunder over the maze of rails that make up this modern system which serves eight Western and Southwestern states.

Throughout the territory served by a subsidiary, the Texas and New Orleans Railroad, Southern Pacific Diesels are lubricated with Gulf Dieselmotive oil. This modern Diesel lubricant contributes to better performance, greater availability, and lower maintenance costs on many of our nation's leading railroads.

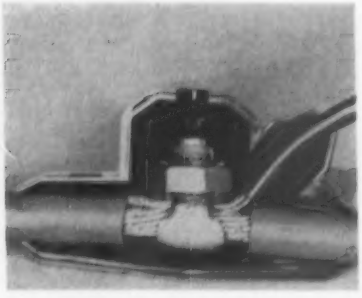
here's why:

1. Chosen for their ability to prevent hard carbon deposits in hot spots, the selected base stocks of Dieselmotive oil also provide an oxidation resistance safety factor.
2. 100% solvent refining of base stocks (which removes undesirable constituents) guarantees greater stability and more effective bearing protection.
3. Superior additive response is obtained by carefully matching the additives to the base stocks. This insures clean rings and grooves, a minimum of piston crown deposits.

CONSULT THE TELEPHONE DIRECTORY FOR THE NUMBER OF YOUR NEAREST GULF OFFICE.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

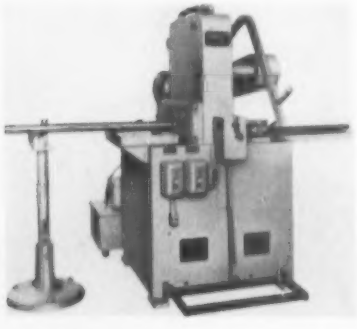


Low Voltage Splicing Kit

Moisture-proof low voltage branch and tap splices that can be insulated in less than 10 min and used under water have been made possible by this splicing kit. The kit, Scotchcast No. 90-B1, contains two single-use branch splice mold halves and a self-mixing package of Scotchcast electrical insulation resin No. 4.

The kit, designed for use in application such as lighting systems or traffic signal systems, under or above ground or where moisture is a problem, requires no special tools or skills according to the manufacturer. The resin, a synthetic, thermosetting plastic, affords complete encapsulation of the splice and hardens into a durable jacket, sealing out moisture and eliminating electrical leakage. Unlike conventional potting compounds, the epoxy resin stays hard permanently and will not soften under the application of heat, pressure or through aging.

The splicing kit can be used on cables having an outside diameter of 0.35 in. to 0.80 in. for the branch and 0.50 in. to 0.80 in. for the feeder and can be utilized on splices made with all conventional connectors. *Dept. D6-2, Minnesota Mining & Manufacturing Co., Dept. RLC, 900 Fauquier street, St. Paul 6.*



Wet Abrasive Cutting Machine

This Model 64 oscillating wet abrasive Cutamatic, for use in metal working shops, factories, foundries, maintenance shops, railroad shops, etc., permits the cutting of medium-sized bar stock through its oscillating principle. With an Allison abrasive cutting wheel, up to 18 in. for certain applications, the device will sever sheets, angles, channels, pipes, tubes and solids of practically all analyses.

It is capable of cutting 3 in. diameter solids, 4 in. diameter tubing and 6-in. by 1-in. steel plate at 90 deg to axis at speeds of approximately 4 sec per sq in. of metal being cut. The oscillating motion of the unit reduces abrasive wheel contact time as cutting is performed with a minimum of wheel pressure. A ½-hp geared-head motor powers the unit.

In the coolant system, a large, wheel-mounted separate coolant tank permits easy removal for chip cleaning. Separate compartments settle out sludge and keep the coolant clean. The device is equipped with a 10-hp totally enclosed fan-cooled motor to drive the abrasive cutting wheel. Drive from the motor to the spindle is through multiple V-belts. *Campbell Machine Division, American Chain & Cable Company, Dept. RLC, 929 Connecticut avenue, Bridgeport 2, Conn.*

Resilient Floor Tile

This covering featuring a multicolored effect derived from the gem stone agate is said to present a new concept in resilient floor tile. Agatine gives the comfort of rubber. Its dense surface eliminates dirt-catching surface pores. Hardly a foot-mark shows against the pattern, with its intricate coloring and symmetrical markings.

The color effect is achieved without the use of laminates or surface finishes. The manufacturing process provides an homogenous material, with the many-colored banded, agate-like structures extending through the full thickness. It is manufactured in a variety of colors in standard 9-in. by 9-in. tiles, and comes in ⅛-in. thickness for heavy traffic areas and in 80 gauge for lighter traffic areas. *Flooring Division, B. F. Goodrich Company, Dept. RLC, Watertown, Mass.*

Rotary Air Grinder

This rotary air grinder, Model 25G, designed for precision die work, is equally adapted to production grinding operations and to bench duties. The tool weighs 2½ lb, has an overall length of 11½ in., and a wheel size of 1¾ in. bonded capacity. It operates at a speed of 20,000 rpm on air pressure of 90 lb., has a ¼ in. inlet pipe thread, and takes a ⅜ in. minimum air hose size.

The tool replaces the Model OOD unit. It is rated to produce 23 per cent more power than former models, has a reduced number of working parts, a 360-deg adjustable exhaust position, and a thumb-type throttle for controlling power feed. *Thor Power Tool Co., Dept. RLC, Aurora, Ill.*

Wide Range Ohmmeters

These precision ohmmeters, Models 244 and 246, have been redesigned for increased ruggedness and portability. According to the manufacturer, they master the problem of change in internal resistance of the batteries due to aging, and are, therefore,

capable of high accuracy in a small, self-contained unit.

The Model 244 unit has ranges of 0-50; 0-500; 0-5,000 and 0-50,000 ohms, with lowest cardinal point of 0.05 ohm at ⅛ in. distance from zero. Model 246 has ranges of 0-100; 0-1,000; and 0-10,000 and 0-100,000 ohms, with lowest cardinal point of 005 ohm at 1/16 in. from zero.

Both instruments feature compensating circuits for changes in internal resistance of batteries, compensation for lead and clip resistance, accuracy to plus or minus 1/32 in. at any point on scale or ½ per cent at center scale, hand-stepped scales, built-in resistor for calibration check, and calibrating resistors wound to within ½ per cent accuracy within temperature limits of 30 to 70 deg C. Batteries furnished are two standard No 6 dry cells. Dimensions are 6 in. by 9 in. by 8-½ in. Weight is 12 lb with batteries. *Associated Research, Inc., Dept. RLC, 3758 W. Belmont avenue, Chicago 18, Ill.*

Arcwelding Machines

Three arcwelding devices—a single range dc rectifier, an ac/dc rectifier for metallic arc-welding and an ac/dc Heliwelder for inert-gas and metallic arcwelding—are available.

The single range unit, DC Bumblebee, is said to have improved selenium rectifiers designed for welding service to convert alternating current to direct current. Its low design permits stacking for parallel operations; weatherproof construction for outdoor operation and its transformer produces instantaneus voltage recovery and control. Forced-draft ventilation assures low operating temperature. It is available in 200, 300 and 400 amp models.

The AC/DC Bumblebee rectifier will supply either ac or dc by the flick of a switch. Both ac and dc welding ranges are wide and a rheostat gives micrometer control

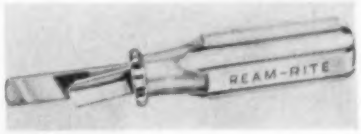
within each range. It is equipped with a heavy-duty, ball-bearing fan and is available in 200, 300 and 400 amp models, with or without power factor correction.

The ac/dc Heliwelder is available in 200 and 300 amp models. The units consist of a single-phase transformer, selenium rectifier and a stabilizing reactor, permiting the operator to select either ac or dc welding current. High frequency, with a rheostat control, is built-in. A balancing resistor in series with the transformer secondary provides correct current for inert-gas welding. A flick of the switch converts the unit from inert-gas welding to metallic arcwelding. *Air Reduction Sales Company, Division of Air Reduction Co., Dept. RLC, 60 East 42 street, New York 17.*

Slip-Retardant Floor and Deck Paint

This slip-retardant floor and deck paint has had 15 months of field testing on tug and barge walkways, decks of tankers, oil loading platforms, refinery catwalks, and refrigerator car floors. It has proved effective where oil, grease and water cause slippery surfaces.

The slip-retardant agent in the enamel is non-metallic and sparkproof. Conventional slip-retardant paints usually contain hard and gritty type anti-slip agents which can cause excessive wear on spray gun equipment. Since this paint contains a relatively soft anti-slip agent, it may be applied by spray or brush. Two coats are recommended, the second following overnight drying. Periodic stirring is needed to re-incorporate the skid-resistant agent. It is available in light gray and maroon. *E. I. du Pont de Nemours & Co., Dept. RLC, Wilmington, Del.*



Deburring Tool

The Hi Ream-Rite has been developed to remove burrs, ream and bevel the cut end of thin wall conduit or Greenfield in one operation. It works on all sizes from ½ in. up. The device has a plastic handle, and two tool-steel blades, one longer than the other. Difference in blade length is for purpose of handling all E.M.T. diameters without binding.

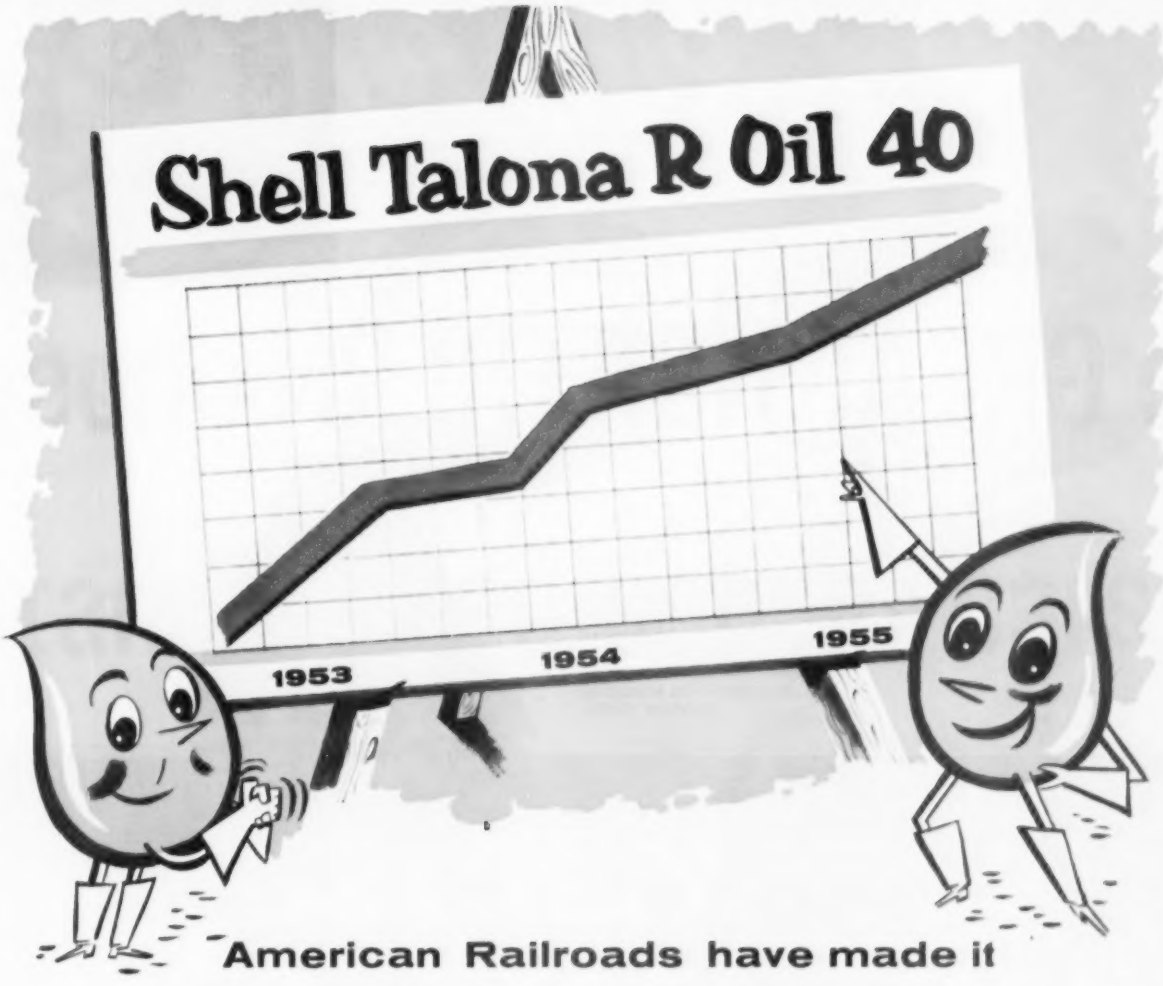
To use, merely go once around to the right and return left to starting point. The operation requires minimum time for smoothing both surfaces. The device is 6 in. long and weighs 2½ oz. *Holub Industries, Inc., Dept. RLC, Box 903, Sycamore, Ill.*

Multi-Purpose Cart

This Hi-Dri 3-in-1 unit, for use in spreading, storing and disposing of oil and grease absorbents, disperses material evenly on all types of floors. It is said to permit application at three times the rate possible with any hand-spreading operation and prevents considerable waste of absorbent.

The cart can also be used to store more than 50 lb of absorbent. It can be moved with little effort from one location to

(*Continued on page 12*)



American Railroads have made it the fastest growing diesel locomotive lubricant in the U. S. A.

The acceptance of Shell Talona R Oil 40 by American railroads has been remarkable. Today, whether judged by number of units or horsepower, this lubricant is outstripping all others in rate of growth.

There is good reason for this: Maximum engine performance can be expected when you use Shell Talona R Oil 40.

Superior anti-wear protection

Greatly reduced wear on pistons, rings and cylinder walls is assured because of the selected combination of additives used in Shell Talona R Oil 40.

Maintains engine performance

The balanced formula of Shell Talona R Oil 40 combines high oxidation stability and anti-corrosive power. It prevents fouling and has excellent detergent-dispersant action.

For further information write to the Shell Railroad Sales Department.

SHELL OIL COMPANY

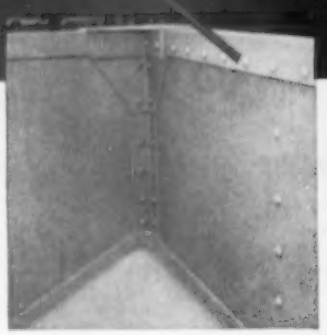
50 West 50th Street, New York 20, New York
100 Bush Street, San Francisco 6, California
Shell Building, St. Louis 3, Missouri

SHELL

the GREAT NORTHERN chose

Heavy cross ridge brace combines with side sheets and posts for stability and prevention of side bulging. Rounded and tapered construction prevents material retention, combats corrosion and precludes snagging by clam shells.

The Standardized 70-ton PS-3 Open Top Hopper. Of 2750 cu. ft. capacity and welded construction, it meets or exceeds all AAR requirements. External side posts are continuously automatic arc welded to side sheets for strength, smooth interior and resistance to corrosion.



Vulnerable spots in ordinary hoppers, corners in PS-3s are made fracture-proof by inside corner bands plus corner caps.

Hopper chutes and doors are designed to withstand in-service abuse. Properly located and sloped for fast unloading into under-track conveyors, chutes are closed by positive-locking, easily-operated, precise-fitting doors.

Side posts are welded to top chord bulb angle, and are tapered at bottom to prevent accidental insertion of hooks.

PS-3

standardized hopper cars

Gussets welded across bottom corner angles provide extra reinforcement against the distorting effects of pushing.

Reinforcement of body bolster bottom flange provides additional anchor to center sill while further securing diagonal braces.

BUILT TO SERVE BEST ON THE GREAT AMERICAN RAILWAY System BY PULLMAN-STANDARD

When the Great Northern decided to add 300 high capacity, heavy-duty hopper cars to its rolling stock fleet, the company bought the PS-3 70-ton Hopper Car.

The PS-3 Open Top Hopper has taken its place along side the famous PS-1 Box Car, the popular PS-2 Covered Hopper, and the versatile new PS-4 all-purpose Flat Car in the Pullman-Standard standardized line.

Like all Pullman-Standard standardized freight cars, the PS-3 has been completely engineered and tested to best fill the Open Top Hopper needs of the railroad industry. Testing includes complete pre-building laboratory examination as well as thorough in-service test follow-through by trained field service engineers. Produced by specialized precision tools on long production runs, PS-3 fabrication excellence is assured by rigid quality control standards. The result of standardization is a ruggedly dependable car built to withstand all the hard usage to which hoppers are traditionally put. And a car that requires minimum maintenance while giving maximum dependability and performance. These benefits, plus lower first cost are built into every PS standardized freight car.

The PS-3's standardization includes sufficient flexibility to allow its production in two sizes: 50-ton 2143 cu. ft., and 70-ton, 2750 cu. ft.

The Great Northern is one of nine users whose orders for the PS-3 in recent years have totaled over 6800 units.

Among the physical characteristics users appreciate in the standardized PS-3 are its strength and durability through mutually supporting components and heavier sheets, its fast unloading abilities, its self-cleaning interior with no material retaining ledges or structural pockets and its long life which experience proves doubles the time between rebuilding.

The 70-ton PS-3 Open Hopper Car is expected to make an important contribution to the Great Northern's continuing efforts to maintain its enviable position at the forefront of American transportation.

WORLD'S LARGEST BUILDER OF PASSENGER AND FREIGHT CARS

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

79 EAST ADAMS STREET, CHICAGO 3, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

EQUIPMENT . . NEW IDEAS . . NEW USES

(Continued from page 8)

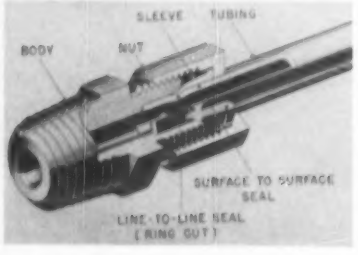
another for ready application. After using, the spent absorbents can be placed in the cart for disposal.

The body of the cart is of heavy gage steel with reinforced edges and welded seams. The tires are semi-pneumatic. The handle is steel tubing. *Waverly Petroleum Products Co., Dept. RLC, Philadelphia.*

Electronic Balancer

Stewart-Warner Model 708 electronic industrial balancer will dynamically and kinetically balance any rotor weighing as much as a 2½-ton locomotive traction generator or as little as a 1-lb flywheel.

The device features diametral range from 1 in. to 68 in. on any rotating piece; 1-lb to 5,000-lb rotor weight capacity; 0.04 in.-oz kinetic sensitivity; 0.25 in. 2-oz dynamic sensitivity; flat-belt friction or direct drive; remote handle-controlled starting, braking and speed adjustment; walking and locking mechanism for speedy length adjustment; etc. *Merrill Engineering Laboratories, Dept. RLC, 1240 Lincoln street, Denver 3, Colo.*



Self-Aligning Tube Fittings

A self-aligning tube fitting, Selfalign, can be installed without disassembling, according to the manufacturer. The tubing is simply inserted in the fitting until it bottoms and the nut is tightened.

The device is said to be suited for instrumentation and other low-and medium-pressure applications using copper and aluminum tubing. The line includes union, union tee, union elbow, male and female connectors, male and female elbows, male tees for pipe on run and pipe on branch. Sizes are ⅛ in., 3/16 in., ¼in., 5/16 in., ⅜ in., and ½ in. in brass stock. Aluminum fittings can be had on special order. *Weaterhead Company, Fort Wayne Division, Dept. RLC, 128 West Washington, Fort Wayne, Ind.*

¼-In. Valve

The ¼-in. D Pilotair valve is for use as directional valves, interlocking valves, transfer valves, sequence valves or shut-off valves in pneumatic control systems with pressures as high as 250 psi and temperatures as high as 200 deg F. The unit supplements the line of ½ in. Pilotair valves.

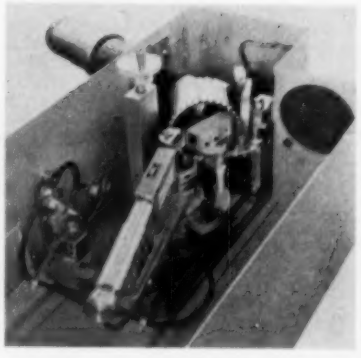
According to the manufacturer, the valve can be used in a system where not much air is needed and where the amount of space that can accommodate a valve is a factor. It can also be used as a remote control for a system using larger quantities of air.

The valve is sectiona'ized in construction which permits over 3,000 different two-three- and four-way valves to be assembled from a few basic parts. Three and four-way valves are built with open exhaust and with tapped exhaust ports. They may be operated manually, pneumatically, mechanically or electrically. *Industrial Products Division, Westinghouse Air Brake Company, Dept RLC, Wilmerding, Pa.*

X-Ray Bearing Analyzer

Utilizing the basic principle of the X-ray spectograph, this instrument quantitatively analyzes the lead-tin alloy platings of crankshaft bearings with an accuracy of 1 per cent for lead and 1 per cent for tin. It permits unskilled operators to check bearings quickly and safely with an average time of 90 sec.

The analyzer is enclosed in a rayproof housing and safety devices protect the operator from radiation hazards. The loading door cannot be opened unless the bearing carriage is in the proper safe location. The unit measures approximately 36 in. in length, 18 in. in width and 12 in. in height. Power for the X-ray tube is supplied from a standard X-ray generator. Energy for the safety interlock system and for the motor which revolves



Bearing in position for X-ray analysis. Mechanism is arranged so crank on top of cabinet moves bearing from the window to central area and back

the bearing can be taken from any 110-volt ac convenience outlet. *Research & Control Instruments Division, North American Philips Company, Dept. RLC, 750 South Fulton avenue, Mount Vernon, N.Y.*

Pipe Insulation

Pip-Jac, a pipe insulation jacketing for the protection of hot or cold insulated lines, is said to provide greater efficiency, wearing qualities and ease of installation. Made of preformed polyethylene, it resists damage from heavy blows, and will not chip, flake, rut or corrode. The product will not take the contours of wrapping material on wrapped lines. No painting is necessary.

Precut to 6 in. lengths and preformed to correct diameters, the product is merely fitted around the insulation, after which it springs shut by itself. Longitudinal seams are fastened with staples. Circumferential seams are sealed with adhesive tape. The insulator is furnished in black for exterior use, or decorator gray for interior use. *Department 78, RLC, Pip-Jac Company, 295 Beverly road, Pittsburgh 16.*

(Turn to page 88)

Now two-coat protection with <u>one</u> cold-sprayed coat...stencil in 2 to 3 hours!

Eliminate time for drying and application of second coat . . . save material and out-of-service costs! One full coat of new KEM KOLD BILD has the build of two standard coats using conventional spray equipment. It dries in 1½ hours and is ready for stenciling in 2 to 3 hours.

KEM KOLD BILD produces a dry-film thickness as heavy as 2½ mils. Good film flow with a minimum of overspray. And KEM KOLD BILD dries to a bright gloss that stands up under repeated cleanings and tough service. Doesn't lift or affect primers. No pinholing or bubbling from entrapped solvents during or after application.

KEM KOLD BILD is being used by leading railroads and car builders now. Why not arrange for a demonstration by contacting The Sherwin-Williams Co., Transportation Sales Division, Cleveland 1, Ohio.

(In Canada: 2875 Centre Street, Montreal)

SHERWIN-WILLIAMS RAILWAY FINISHES

†Trade-Mark

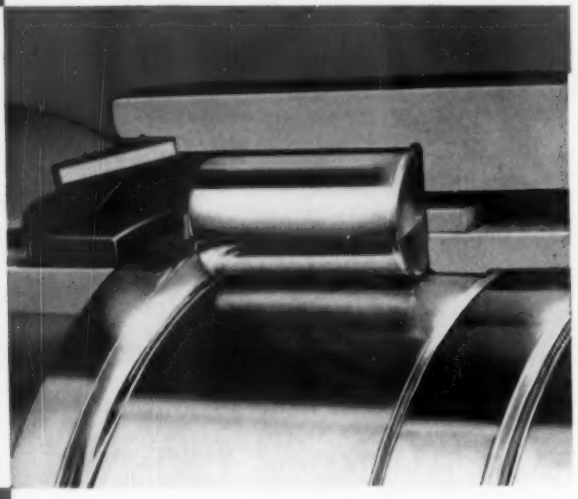
LOOK AT THESE SAVINGS WITH

SAVES INSTALLATION TIME!

new simplified design reduces installation time and cost to minimum—only 4 parts on axle

SAVES TROUBLESOME FITTING!

all parts interchangeable; no fitting adjustments needed with *big straight cylindrical* rollers



SAVES COSTLY LUBRICATION!

three-year supply of grease is sealed in bearing at factory; dirt and water are sealed out

GM GENERAL MOTORS

ANOTHER CONTRIBUTION TO RAILROAD PROSPERITY

THE HYATT HY-ROLL
Roller Bearing for freight cars

No wonder progressive railroads are switching to the low-cost, low-upkeep HYATT Hy-Roll! This advanced roller bearing is *so simplified, so dependable* and *so economical* that it makes the big switch to roller bearing freight *practical* at last!

With the HYATT Hy-Roll you can give your shippers speedier service—practically eliminate costly inspection, lubrication and hotbox delays—and *make sure* that your new freight cars will remain efficient and competitive for years to come. Remember, tomorrow's profits depend on foresight today. The HYATT Hy-Roll is your *best buy* for the *long haul!*

Call your HYATT Sales Engineer or write for further details now. Hyatt Bearings Division of General Motors, Harrison, N.J.

ONE BEARING FITS BOTH!

With the addition of a simple wedge or frame adapter, the HYATT Hy-Roll fits both pedestal and integral trucks.

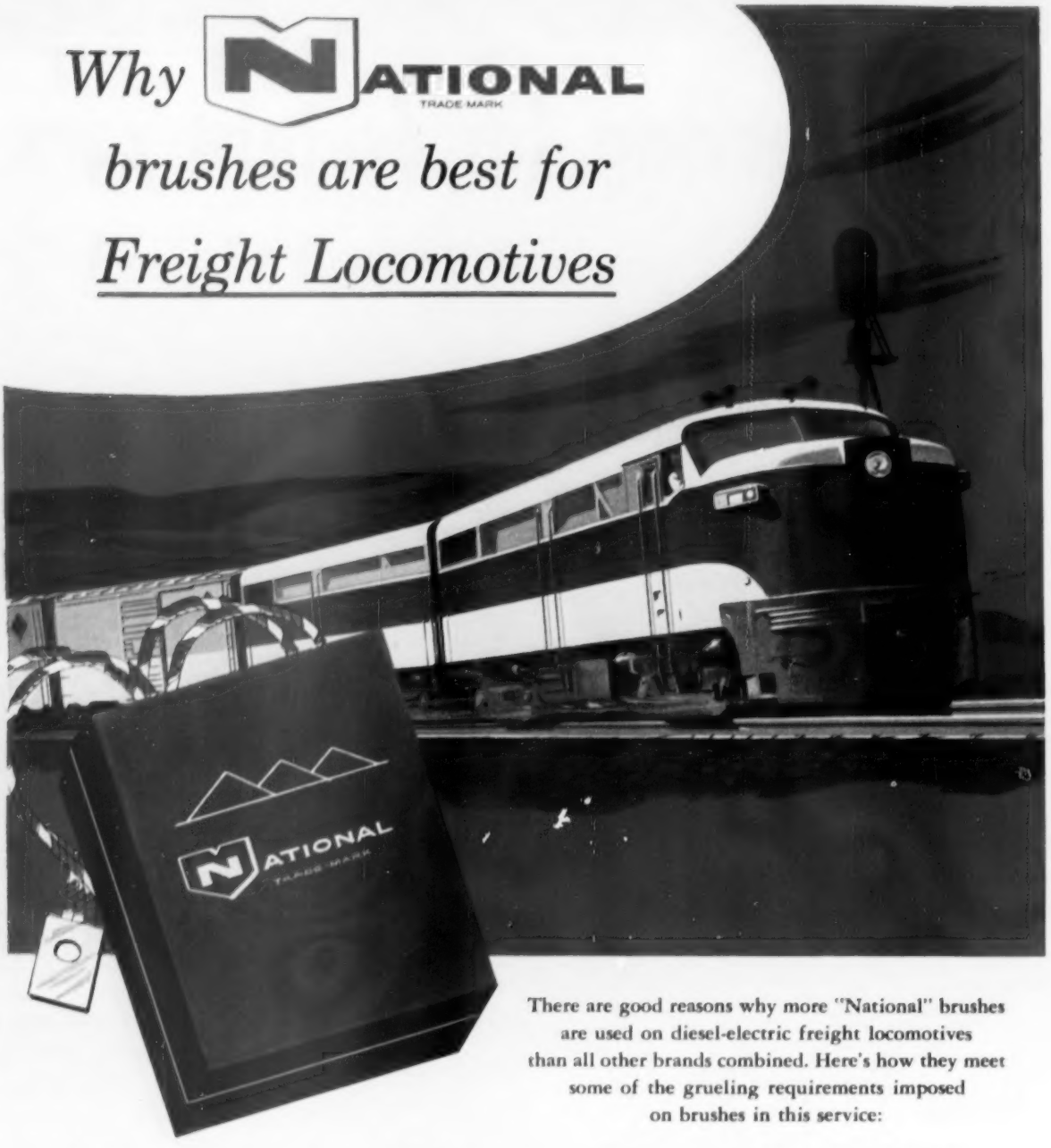
The revolutionary new GM Aerotrains speed on HYATT *straight cylindrical* roller bearings.

MORE HYATT ROLLER BEARINGS ARE IN USE ON AMERICAN RAILROADS THAN ANY OTHER MAKE

HYATT

HY-ROLL BEARINGS FOR NON-STOP FREIGHT

Why NATIONAL TRADE MARK *brushes are best for Freight Locomotives*



There are good reasons why more "National" brushes are used on diesel-electric freight locomotives than all other brands combined. Here's how they meet some of the grueling requirements imposed on brushes in this service:

1. Long life despite varied speeds and loading.
2. Excellent commutator film under all road-grade conditions.
3. Greater strength to absorb shock.
4. Better rideability for constant contact.

Not only in freight service, but in *all* types of diesel-electric locomotive service, "National" brushes deliver more for your brush dollar.

Specify NATIONAL TRADE MARK the brand of *earned* performance.

Best For All Types Of Equipment . . . Preferred For All Types Of Service.

The term "National", the Three Pyramids Device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY • A Division of Union Carbide and Carbon Corporation • 30 East 42nd Street, New York 17, N. Y.

Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. *In Canada:* Union Carbide Canada Limited, Toronto

NEWS

Court Rules on Safety Appliance

Equipment on a freight car need not be required by regulations of the Interstate Commerce Commission to become a safety appliance covered by absolute-liability provisions of the Safety Appliance Act. The United States Supreme Court has so ruled, and in doing so it rejected contentions of the ICC itself.

The ruling was in a case docketed as No. 150, Shields v. Atlantic Coast Line. The car equipment involved was a so-called dome running board attached to the side of a tank car just below the dome end used in unloading operations. Shields, an independent contractor in the business of unloading gasoline, was working on a dome running board which broke, causing him to fall and sustain injuries.

He brought suit in the federal district court, winning a jury verdict which was reversed by the Circuit Court of Appeals for the Fifth Circuit. His appeal brought the case to the Supreme Court.

The ICC filed a brief contending, as the court put it, that "only appliances designed to insure safety while the train is in movement" are covered by the absolute-liability provisions of the Safety Appliance Act, and, "therefore, a dome running board cannot be a statutory running board." The court rejected this contention.

It also rejected the ACL's contention that it owed no duty under the Safety Appliance Act to one who was not its employee. Shields, it said, "was a member of one class for whose benefit" the dome running board "is a safety appliance under the statute"; and "the violation of the statute must, therefore, result in absolute liability."

The court's decision, announced by Justice Minton, was accompanied by a dissent from Justice Reed, with whom Justices Frankfurter and Burton agreed. They said the commission's construction of the statute should have been followed.

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE APRIL ISSUE

DIESEL-ELECTRIC LOCOMOTIVE ORDERS

Road and builder	*No. of units*	*Horsepower*	*Service*	*Other detail*
PENNSYLVANIA:				
Electro-Motive	55	1,750	All purpose	Deliveries of all 79 locomotives to begin in June.
Alco Products	9	1,800	All purpose	
	6	2,400	All purpose	
Fairbanks-Morse	9	2,400	All purpose	
SEABOARD AIR LINE:				
Electro-Motive	25	1,750	Road switching	Approximate cost, $4,000,000. Delivery expected to be completed by November.

FREIGHT-CAR ORDERS

Road and builder	*No. of cars*	*Type of car*	*Cap., tons*	*Length, ft.*	*Other detail*
CHESAPEAKE & OHIO:					
Pullman-Standard	500	Box	50	50	Being delivered. Originally ordered by New Haven. Cost, $5,500,000. To be equipped with roller bearings and damage-free loaders.
CHICAGO, ROCK ISLAND & PACIFIC:					
Pullman-Standard	300	Hopper	—		
	200	Gondola	—		
FLORIDA EAST COAST:					
Magor Car	100	Gondola	—		Cost, $715,000. For third quarter delivery.
Pullman-Standard	75	Covered hopper	—		Cost, $295,225. For July delivery.
NORFOLK & WESTERN:					
Pullman-Standard	50	Covered hopper	70		December delivery
TEXAS & PACIFIC:					
Company shops	65	Box	—		
	35	Refrigerator	—		"DF" type. All cars to be built
	100	Gondola	70		next year.
	30	Covered hopper	70		
ATCHISON, TOPEKA & SANTA FE:					
ACF Industries	3	Baggage-mail	—		Six cars being delivered.
	3	Railway post office	—		

PASSENGER-CAR ORDERS

Road and builder	*No. of cars*	*Type of car*	*Other detail*
ATCHISON, TOPEKA & SANTA FE:			
ACF Industries	3	Baggage-mail	Six cars being delivered.
	3	Railway post office	

INQUIRIES AND NOTES

FREIGHT CARS:

Boston & Maine.—Directors have authorized rebuilding 350 gondola cars at Concord, Mass., shops. Estimated cost, $500,000.

Illinois Central.—First 100 of 2,000 box cars ordered last year from IC shops are being equipped with DF equipment at estimated cost of $2,000 a car (Railway Locomotives and Cars, Oct. 1955, p. 14.)

Louisville & Nashville.—Will order 2,000 coal hopper cars and 100 covered hopper cars, estimated cost $15,800,000.

Reading.—Will equip 100 box cars with damage-free loading devices; cost $198,000.

Santa Fe.—Will modernize 1,000 freight cars in its Topeka shops this year; work will include new insulation in old refrigerator cars, new steel floors in gondola cars.

LIGHTWEIGHT TRAINS:

Chicago, Rock Island & Pacific.—Plans under consideration to buy another lightweight train for service between Minneapolis-St. Paul and Houston by late 1957 or early 1958. Type still undecided; said to depend on best design to come out of current lightweight train race. The 1,300-mi. run would undoubtedly require sleeping accommodations.

Personal Mention

Chesapeake & Ohio

H. L. ANDERSON, roundhouse foreman at Clifton Forge, Va., appointed general foreman.

Long Island

CHRIST MEYERS, appointed assistant chief engineer—signals and electric traction at Jamaica, N. Y. Formerly engineer in charge of communications of the Pennsylvania at Pittsburgh.

New York Central

New York

A. C. HEARLE appointed assistant industrial engineer.

C. H. DERNER appointed assistant industrial engineer.

R. W. LEAR appointed diesel locomotive inspector.

R. G. SAUERMAN appointed assistant supervisor diesel records. Headquarters, Cleveland.

Maine Central

Waterville, Me.

FRANK H. BENNETT, shop superintendent, retired.

GEORGE P. SILVA, assistant shop superintendent, appointed shop superintendent.

ELDEN H. FINNIMORE, assistant foreman, appointed assistant shop superintendent.

Portland, Me.

H. G. HOOK, master mechanic, appointed superintendent of locomotive maintenance. Former position abolished.

J. D. ROURKE, division general car foreman, appointed superintendent of car maintenance. Former position abolished.

Norfolk & Western

HARRY SHAW, foreman at Clare (Ohio), shop, retired.

J. D. CONOVER, shop inspector at Clare (Ohio) shop, appointed foreman.

L. D. SENTER, night roundhouse foreman at Bristol, Va., retired.

C. J. TAYLOR, foreman at Weller Yard, appointed night roundhouse foreman at Bristol, Va.

Southern

KIMBLE L. POLLITT, engineer quality control at Hayne shop, Spartanburg, S. C., appointed assistant diesel superintendent at Washington, D. C.

WALTER G. SCHWEINEBRATEN, assistant master mechanic at Birmingham, Ala., appointed master mechanic at Atlanta, Ga.

RUSSELL L. TURNER, master mechanic at Atlanta, Ga., appointed master mechanic at Meridian, Miss.

WILLIAM H. FLETCHER appointed engineer quality control at Hayne shop, Spartanburg, S. C.

RICHARD G. NETTLES appointed general foreman at Sheffield, Ala.

J. E. CHILDERS appointed assistant foreman car repairs at Coster Shop, Knoxville, Tenn.

D. L. SHELL appointed assistant foreman car repairs at Coster Shop, Knoxville, Tenn.

HEYWARD H. HAIR appointed foreman pipe and tin shop at Spencer, N. C.

HERMAN K. MASSEY appointed gang foreman car repairs at Hayne shop, Spartanburg, S. C.

Supply Trade Notes

GENERAL ELECTRIC COMPANY.—The gas-turbine manufacturing department facilities at Schenectady, N.Y., are being expanded at a cost of $6,800,000. In addition, a headquarters building, which will house engineering, marketing, financial, and employee relations functions will be established adjacent to the manufacturing operations.

■

FABREEKA PRODUCTS COMPANY.—Fabreeka has moved from Summer street, to 1190 Adams street, Boston 24.

■

WARREN TOOL CORPORATION.—*W. C. Salisbury* has been appointed assistant sales manager at Warren, Ohio, and *T. C. Overman*, midwestern sales representative at Chicago. Mr. Salisbury was formerly Chicago sales representative.

■

JANEWAY ENGINEERING COMPANY.—*Robert N. Janeway*, chief engineer of the Chrysler Corporation in charge of dynamics-research, has resigned to form the Janeway Engineering Company, with headquarters in the Machinery building, 2832 E. Grand boulevard, Detroit 11. The company will specialize in suspension design and development and will encompass all areas of applied dynamics.

■

CHICAGO RAILWAY EQUIPMENT COMPANY.—*J. S. Walker* has been re-elected president, chairman of the executive committee, and chairman of the board. No changes in the company's management resulted from the recent proxy dispute.

■

BALDWIN-LIMA-HAMILTON CORPORATION.—*Joseph Rosecky*, manager of manufacturing for Eddystone (Pa.) operations, has been appointed vice-president in charge of the Eddystone plant. *Walker H. Evans*, district manager, Philadelphia area, has retired.

■

WAUKESHA MOTOR COMPANY.—*Melvin C. Erickson* has been appointed chief engineer, railway division. *Paul E. Mantz*, field sales and service engineer, has been named assistant sales and service manager.

■

YALE & TOWNE MANUFACTURING COMPANY.—*Carl O. Hedner*, sales manager of hoisting equipment, has been named assistant general sales manager of its materials handling division, at Philadelphia.

TOLEDO PIPE THREADING MACHINE COMPANY.—The following have been appointed to regional sales managers: *Blake Wilson*, north central area; *Marvin Cox*, western region; *R. W. Warnke*, east north central territory and eastern Canada; *W. L. Gahman*, east coast region of New England and middle Atlantic states; and *H. R. Strouse*, southeastern territory, including Texas, Oklahoma, Louisiana and Mississippi.

(Turn to page 20)

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

Item No.		Month of January 1956	1955
3	Road locomotive miles (000) (M-211):		
3-05	Total, steam	4,599	4,796
3-06	Total, Diesel-electric	37,103	34,186
3-07	Total, electric	736	698
3-04	Total, locomotive-miles	42,662	39,893
4	Car-miles (000,000) (M-211):		
4-03	Loaded, total	1,664	1,535
4-06	Empty, total	957	911
6	Gross ton-miles-cars, contents and cabooses (000,000) (M-211):		
6-01	Total in coal-burning steam locomotive trains	10,847	10,533
6-02	Total in oil-burning steam locomotive trains	1,410	1,240
6-03	Total in Diesel-electric locomotive trains	104,563	94,228
6-04	Total in electric locomotive trains	2,185	2,103
6-06	Total in all trains	119,776	108,812
10	Averages per train-mile (excluding light trains) (M-211):		
10-01	Locomotive-miles (principal and helper)	1.03	1.02
10-02	Loaded freight car-miles	41.9	41.2
10-03	Empty freight car-miles	24.1	24.4
10-04	Total freight car-miles (excluding caboose)	66.0	65.6
10-05	Gross ton-miles (excluding locomotive and tender)	3,019	2,920
10-06	Net ton-miles	1,370	1,291
12	Net ton-miles per loaded car-mile (M-211)	32.7	31.3
13	Car-mile ration (M-211):		
13-03	Per cent loaded of total freight car-miles	63.5	62.8
14	Averages per train hour (M-211):		
14-01	Train miles	18.8	19.2
14-02	Gross ton-miles (excluding locomotive and tender)	56,046	55,524
14	Car-miles per freight car day (M-240):		
14-01	Serviceable	46.0	43.3
14-02	All	44.2	40.7
15	Average net ton-miles per freight car-day (000) (M-240)	917	801
17	Per cent of home cars of total freight cars on the line (M-240)	42.1	52.7
	PASSENGER SERVICE (DATA FROM I.C.C. M-213)		
3	Road motive-power miles (000):		
3-05	Steam	1,000	1,438
3-06	Diesel-electric	20,740	21,261
3-07	Electric	1,323	1,415
3-04	Total	23,063	24,115
4	Passenger-train car-miles (000):		
4-08	Total in all locomotive-propelled trains	235,294	243,507
4-09	Total in coal-burning steam locomotive trains	5,894	8,408
4-10	Total in oil-burning steam locomotive trains	2,524	3,862
4-11	Total in Diesel-electric locomotive trains	211,861	215,093
12	Total car-miles per train-miles	9.80	9.73
	YARD SERVICE (DATA FROM I.C.C. M-215)		
1	Freight yard switching locomotive-hours:		
1-01	Steam, coal-burning	259,608	238,990
1-02	Steam, oil-burning	28,916	41,824
1-03	Diesel-electric[1]	3,881,017	3,478,462
1-06	Total	4,172,641	3,766,094
2	Passenger yard switching hours:		
2-01	Steam, coal-burning	7,720	9,808
2-02	Steam, oil-burning	3,340	4,386
2-03	Diesel-electric[1]	252,070	257,259
2-06	Total	289,614	297,833
3	Hours per yard locomotive-day:		
3-01	Steam	5.8	4.3
3-02	Diesel-electric	15.9	15.1
3-05	Serviceable	15.7	14.8
3-06	All locomotives (serviceable, unserviceable and stored)	14.2	12.7
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.73	1.70
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	.76	.76

[1]Excludes B and trailing A units.

Step in the right direction

...safety devices

secured with *Elastic Stop*® nuts

*safety appliances and others such as:

coupler carriers
draw gears
pedestal tie bars
brake rigging
spring equalizer seats
truck mounted equipment
center plate bolts
miscellaneous equipment
on under frame

Today, major Diesel builders are using Elastic Stop nuts for a variety of critical applications.* No other fastener provides so much positive protection against the pounding vibration that is a part of modern high speed freight and passenger operation.

Elastic Stop nuts offer production and maintenance advantages, too. The same elastic collar that damps out vibration makes the nuts self-locking—a one-piece assembly—and reusable many times.

Many roads are replacing double nuts or castellated nuts with Elastic Stop nuts wherever safety of personnel and maintenance costs are factors. ESNA can serve you better on these and all other critical applications.

ESNA

Elastic Stop Nut Corporation of America
also maker of the ROLLPIN

ROLLPIN

Mail Coupon

for further information on ESNA® self-locking fasteners for locomotives, freight and passenger cars.

Railway Sales Division, Dept. N61-523
2330 Vauxhall Road, Union, N. J.
Please send me the following free information:

☐ Elastic Stop nut bulletin
☐ Rollpin bulletin
☐ Here is our problem. What fastener do you suggest?

Name_____ Title_____

Firm_____

Street_____

City_____ Zone____ State_____

SUPPLY TRADE NOTES

(Continued from page 18)

G. S. BLAKESLEE & CO.—*J. Fryer* has been appointed sales engineer, covering Connecticut and the western part of Massachusetts, including Springfield and Holyoke. *Harry J. Beierwaltes* has been appointed sales engineer, covering western Michigan and the northern section of Illinois.

■

ROBERTSHAW-FULTON COMPANY, FULTON SYLPHON DIVISION.—*George L. Ogdin, Jr.*, assistant general sales manager, has been named general sales manager, at Knoxville, Tenn.

■

KLEMP METAL GRATING CORPORATION.—*Dan W. Oram* has been appointed executive director of sales.

■

PLASTEEL PRODUCTS CORPORATION. —*Charles W. Boyle* has been appointed Philadelphia district manager.

■

SELLERS INJECTOR CORPORATION.—Sellers has acquired the complete line of injectors formerly manufactured by the *Ohio Injector Company*. The transaction includes spare parts, servicing and reconditioning facilities, all of which are now available at the Sellers plant in Philadelphia.

■

GRAYBAR ELECTRIC COMPANY. — *Wayne J. Berry*, manager at Memphis, Tenn., has been named Southeastern district manager at Richmond, Va.

■

COPPERWELD STEEL COMPANY. — *Maskell E. Brown* has joined Copperweld as sales engineer in eastern Pennsylvania, New Jersey and New York City.

■

OHIO BRASS COMPANY.—*T. J. Harris*, district manager at Chicago, has been transferred to Dallas, as district manager for the Texas territory. He succeeds *E. C. Thompson*, appointed general factory manager in Mansfield, Ohio. *H. A. Blocki*, of the advertising and sales staff at Mansfield, has been appointed Chicago district manager.

■

GENERAL MOTORS CORPORATION, ELECTRO-MOTIVE DIVISION.—Manufacturing space at Plant No. 1 in McCook, Ill., is expected to be increased 42 per cent by early 1957.

HYATT BEARINGS DIVISION.—*Robert V. Simpson*, formerly with American Brake Shoe Company, has joined the railroad sales staff of Hyatt Bearings as a sales engineer.

■

T-Z RAILWAY EQUIPMENT COMPANY; MORRIS B. BREWSTER COMPANY.—*John T. Ash* and *Walter Wesol* have become vice-presidents, with headquarters at Chicago.

■

HENNESSY LUBRICATOR COMPANY. —*J. J. Hennessy, Jr.*, has succeeded his father *J. J. Hennessy, Sr.*, as president.

■

AMERICAN STEEL FOUNDRIES.—*A. J. McDonald*, vice-president, has retired.

G. T. Mitchell

C. A. Mapp

VAPOR HEATING CORPORATION. — *Gerald T. Mitchell* has been appointed chief engineer, in charge of research and production engineers.

■

SKF INDUSTRIES.—*James H. Sutherland* has been appointed midwestern regional sales manager, succeeding *Philip A. Carlson*, retired.

The *TEK Bearing Company*, Bridgeport, Conn., has been appointed distributor of SKF replacement products throughout New England and parts of New York and New Jersey.

■

NATIONAL MOTOR BEARING COMPANY.—*Park Q. Wray, Jr.*, has been named vice-president, sales. Mr. Wray was previously general sales manager.

■

STRATOFLEX, INC.—*C. A. Thomas*, sales engineer, has been appointed general manager of sales at Fort Worth, Tex.

■

A. M. BYERS COMPANY.—*J. Frederick Byers, Jr.*, executive vice-president, has been elected president, succeeding A. B. Drastrup, resigned.

FAIRBANKS, MORSE & CO.—*Charles A. Mapp* has been appointed district manager, Railroad Division, with headquarters in Chicago. Mr. Mapp will be responsible for the sale of all products to the railroads, including locomotives, in the Middle West, including the Twin City area, and in the St. Louis and southwest areas for locomotive sales only.

■

F. E. SCHUNDLER COMPANY, PLASTINAIL FLOOR DIVISION.—*John B. Braham* has been appointed sales representative to the midwestern railroads.

■

ST. LOUIS RAILWAY SUPPLY COMPANY.—Offices of this company have been moved to the Railway Exchange Building, St. Louis 1. Warehousing operations continue at 2114 North Second street, St. Louis 6.

■

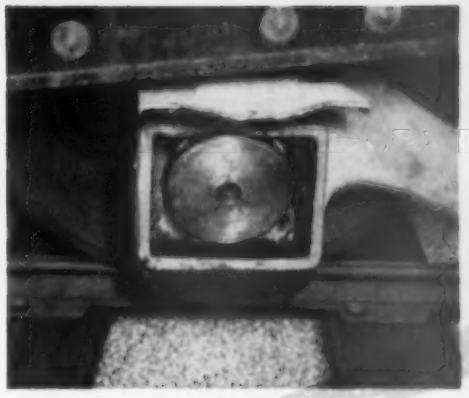
PLOMB TOOL COMPANY.—Plomb Tool has acquired certain assets of the *Tubing Appliance Company*, including essential machinery, tooling, patents, and inventories of TAC ratchet wrenches. All physical assets involved have been moved to the PROTO plant of Plomb Tool in Los Angeles.

SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (thousands)	No. of cars set off between division terminals because of hot boxes			Miles car set off
		System	Foreign	Total	
January, 1952	2,824,299	3,208	7,197	10,405	271,437
January, 1953	2,828,906	2,219	4,123	6,342	446,059
1954					
January	2,583,485	3,082	3,797	6,879	375,561
February	2,445,214	2,953	4,066	7,019	348,370
March	2,658,757	2,196	3,637	5,853	455,813
April	2,570,518	3,079	5,149	8,228	312,411
May	2,713,511	4,416	6,510	10,926	248,353
June	2,662,375	6,597	9,617	16,214	164,202
July	2,678,234	7,956	10,912	18,868	141,946
August	2,696,135	7,568	9,742	17,310	155,756
September	2,614,432	6,740	8,882	15,622	167,355
October	2,852,825	5,182	6,985	12,167	234,472
November	2,717,219	2,515	3,467	5,982	454,232
December	2,751,644	1,501	2,294	3,795	725,070
1955					
January	2,714,070	1,813	2,701	4,514	601,256
February	2,517,483	2,266	3,970	6,236	403,701
March	2,830,398	2,717	5,076	7,793	363,197
April	2,787,705	3,471	6,485	9,956	280,002
May	2,931,850	4,860	8,664	13,524	216,788
June	2,945,955	6,080	10,226	16,306	180,666
July	2,906,558	8,086	13,635	21,721	133,813
August	2,954,459	8,555	14,358	22,913	128,941
September	2,923,592	5,896	10,469	16,365	178,649
October	3,025,177	3,966	7,182	11,148	271,364
November	2,950,228	2,010	3,972	5,982	493,184
December	2,922,034	1,819	3,774	5,593	522,444
1956					
January	2,925,109	2,029	4,302	6,331	462,029

simple The "Redipak" lubricating pad is a square block of foam neoprene, molded with cored passages and covered with cotton wicking material. It is installed—without any other packing—in the standard journal box without jacking the box.

foolproof The square "Redipak" lubricating pad is fully symmetrial—it can be installed any side out, either face up. It can be inserted by hand or with a "Redipaker"—a simple bent rod which speeds up the work—and is removed with a standard packing hook.



Stop Hot Boxes!

"Redipak" Lubricating Pad points the way towards elimination of the hot box problem

cool-running The "Redipak" lubricated bearing has operated as much as 50°F. cooler than waste-lubricated bearings, under certain conditions. In laboratory starvation tests, with no free oil in the box, the "Redipak" retained enough oil for 10,000 miles of high speed operation.

long-lasting In service tests, "Redipak" lubricating pads have operated over 90,000 miles each, without noticeable wear. No pad has shown any sign of glazing. Inspection of the bearings shows that the pads do not lint.

No waste . . . with "Redipak"!

AMERICAN
Brake Shoe
COMPANY

NATIONAL BEARING DIVISION
ST. LOUIS 10, MISSOURI

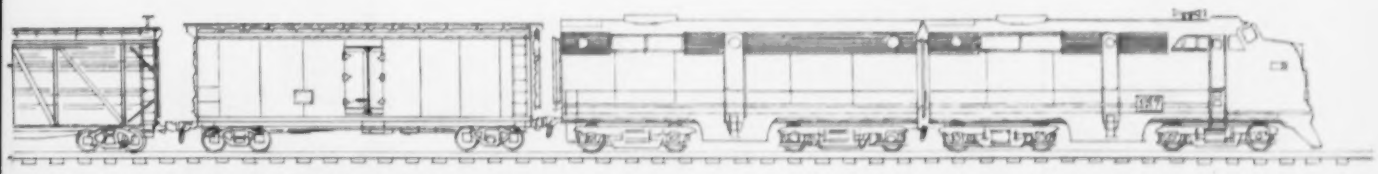
A-8234

Buy Griffin EQS

FOR LONGER FLANGE AND TREAD WEAR!

The Griffin grain structure on tread and flange is at right angles to the rail—giving you a longer-lasting wheel.

Because of advanced casting methods . . . pressure pouring in machined graphite molds . . . the roundness of the Griffin EQS is practically perfect as cast. Absolutely no tread machining is necessary. The toughest metal *stays* where it reduces your costs . . . at the point of contact with the rail!



GRIFFIN EQS

ELECTRIC QUALITY STEEL

Griffin Wheel Company
445 N. Sacramento Blvd., Chicago 12
Plants strategically located to serve all railroads

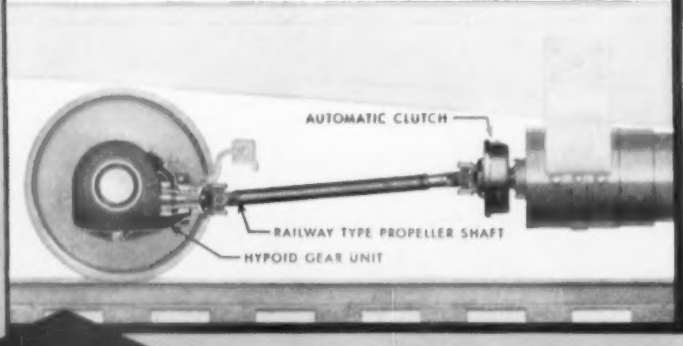
Give the "green" to ***GRIFFIN*** *and watch your costs go down!*

MORE THAN 11,000 SPICER *Positive* GENERATOR DRIVES

in operation for over 70 railroads

The Spicer Railway Generator Drive for lighting, air-conditioning, refrigerating and other electrical equipment consists of a very simple application of long-lived hypoid gear and pinion mounted on a standard axle. The drive from the gears is positive and constant through Spicer Universal Joints and Propeller Shaft to the Spicer Automatic Clutch mounted between the generator and the propeller shaft. This automatic clutch completely absorbs all shocks and disconnects the drive line in case of excessive overload, and also completely disconnects the generator at speeds below 8 miles per hour, eliminating shock loads when cars are being shunted.

Spicer Positive Railway Generator Drives can be quickly and economically adapted to new car designs and reconditioning jobs. Write for further details.



Spicer ***Positive*** **GENERATOR DRIVES**

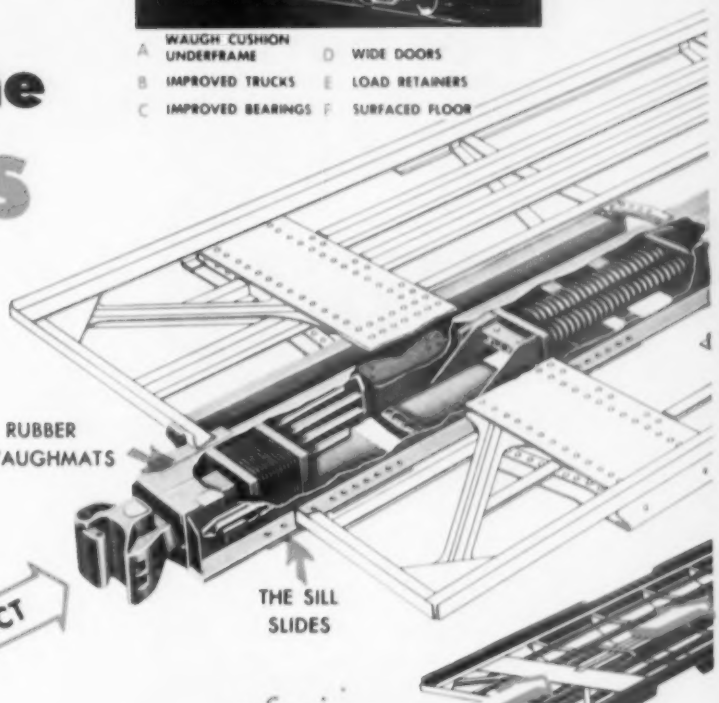
Manufactured, Sold and Serviced by

DANA CORPORATION

Toledo 1, Ohio

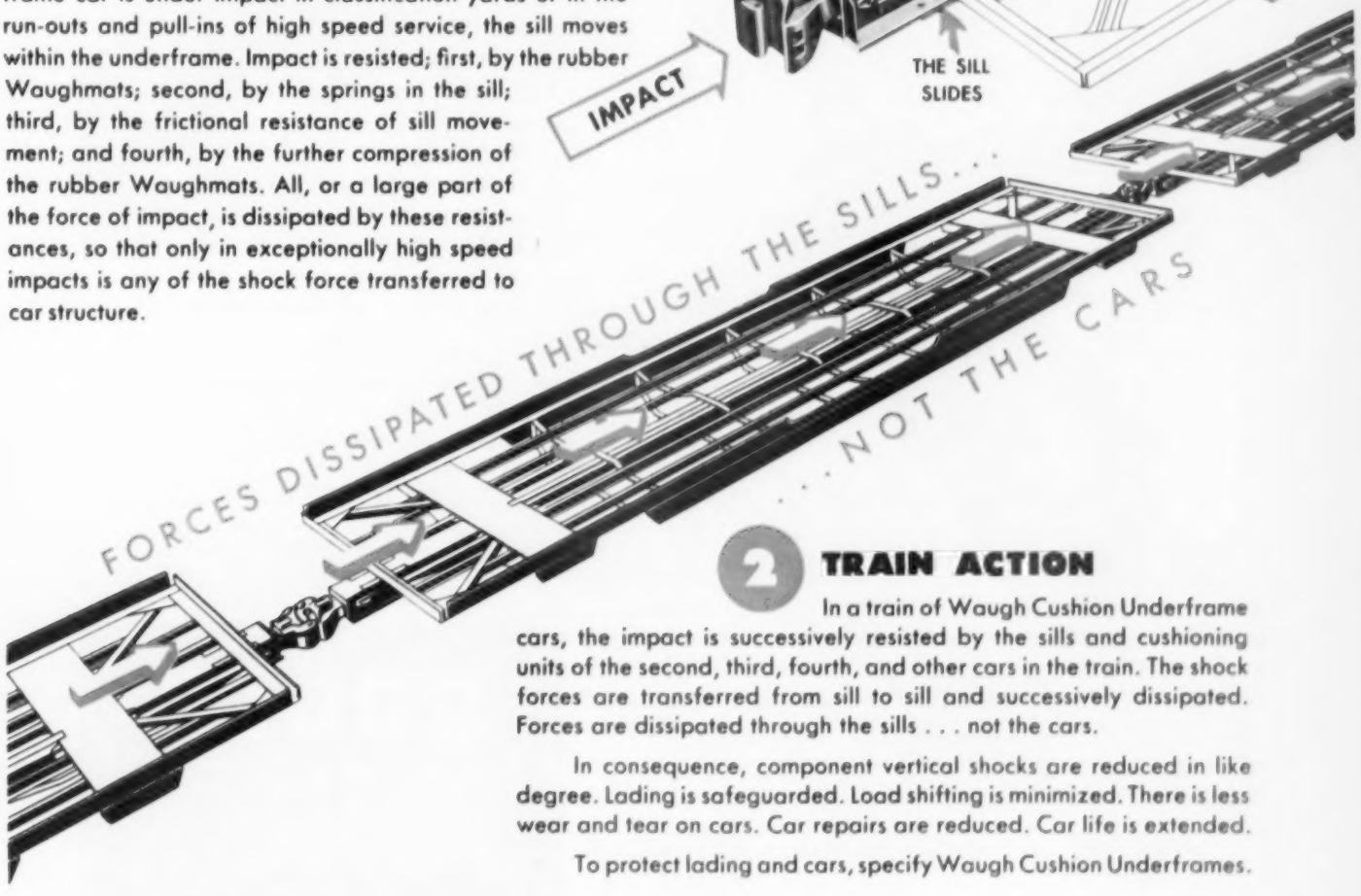
How the Waugh Cushion Underframe SHOCK-PROOFS cars and lading!

A WAUGH CUSHION UNDERFRAME
B IMPROVED TRUCKS
C IMPROVED BEARINGS
D WIDE DOORS
E LOAD RETAINERS
F SURFACED FLOOR



1 CAR ACTION

When one Waugh High Capacity Cushion Underframe car is under impact in classification yards or in the run-outs and pull-ins of high speed service, the sill moves within the underframe. Impact is resisted; first, by the rubber Waughmats; second, by the springs in the sill; third, by the frictional resistance of sill movement; and fourth, by the further compression of the rubber Waughmats. All, or a large part of the force of impact, is dissipated by these resistances, so that only in exceptionally high speed impacts is any of the shock force transferred to car structure.



2 TRAIN ACTION

In a train of Waugh Cushion Underframe cars, the impact is successively resisted by the sills and cushioning units of the second, third, fourth, and other cars in the train. The shock forces are transferred from sill to sill and successively dissipated. Forces are dissipated through the sills . . . not the cars.

In consequence, component vertical shocks are reduced in like degree. Lading is safeguarded. Load shifting is minimized. There is less wear and tear on cars. Car repairs are reduced. Car life is extended.

To protect lading and cars, specify Waugh Cushion Underframes.

WAUGH EQUIPMENT COMPANY

New York, Chicago, St. Louis. Canadian Waugh Equipment Company, Ltd., Montreal

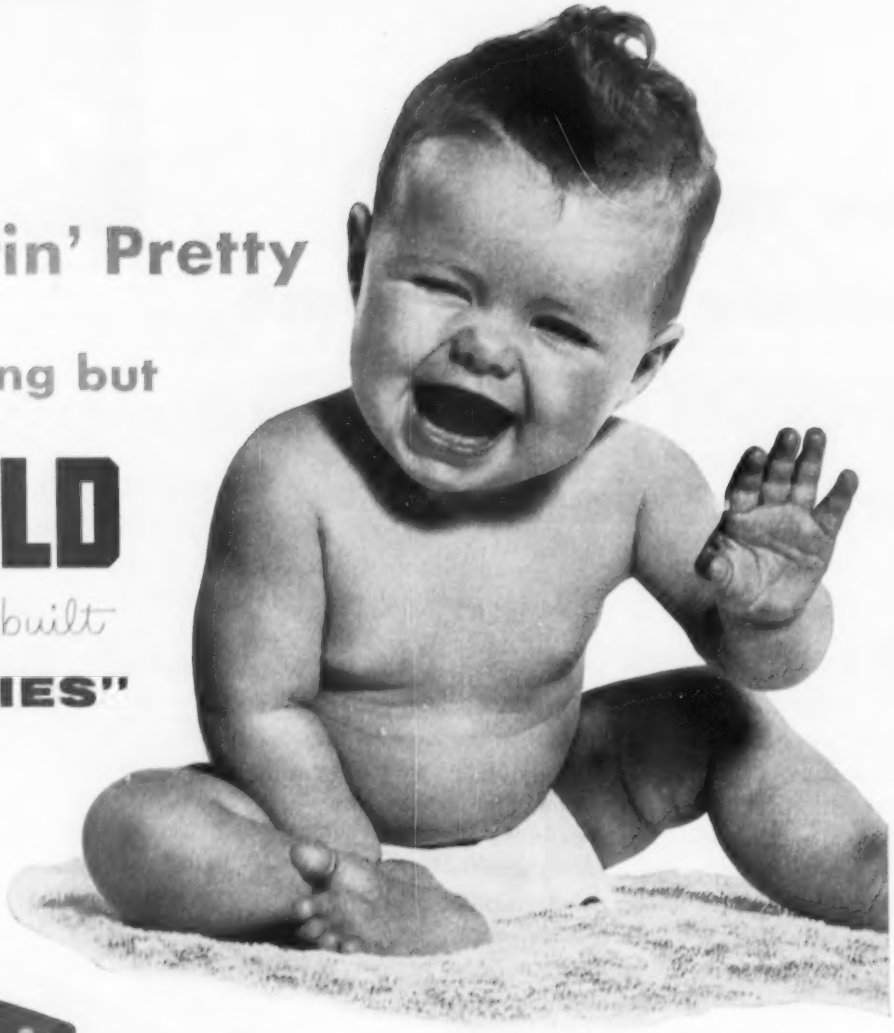
"I'm Sittin' Pretty

use nothing but

GOULD

Research-built

BATTERIES"



America's Finest!
GOULD KATHANODE
BATTERIES
for Air Conditioning
and Car Lighting

There are three big reasons why it pays to choose Gould Research-Built Batteries:

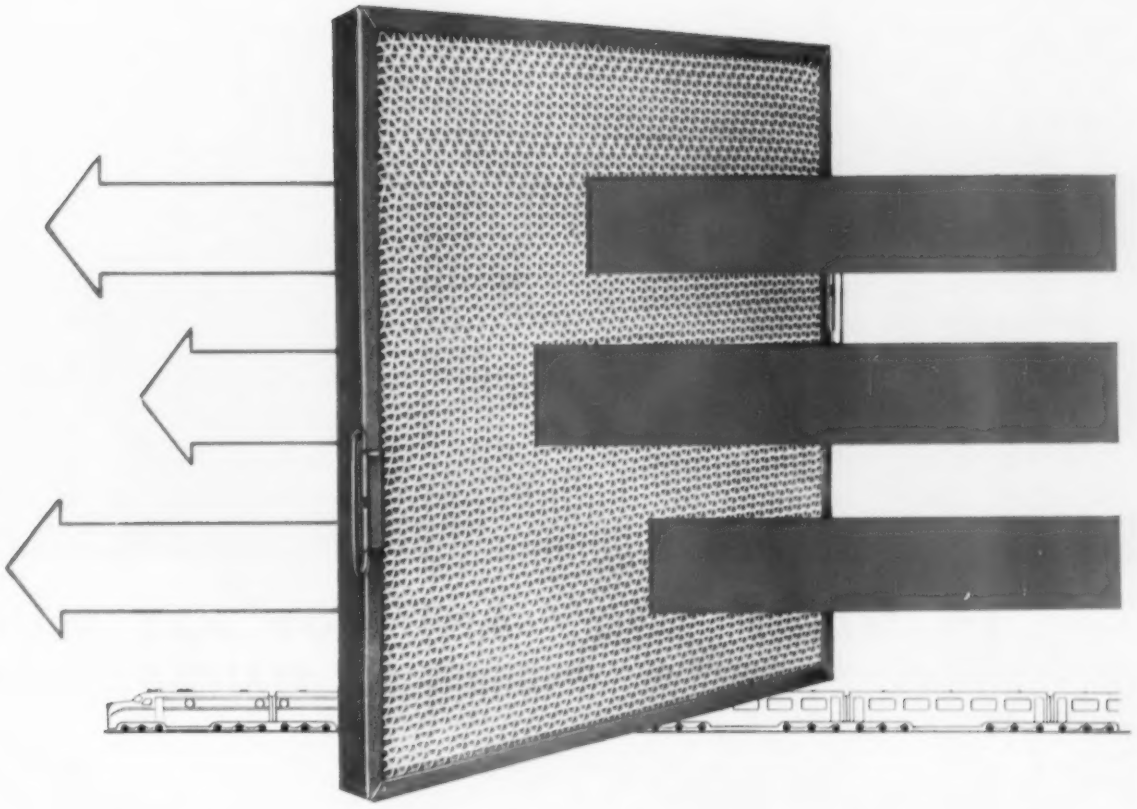
1. They are the finest batteries modern science can give you—research-built for longest service life.
2. Strategically located Gould plants assure prompt attention to your battery requirements.
3. Gould Field Engineering Service, finest in the industry, nation-wide in scope, is as close to you as your telephone, always ready to see that your batteries are properly cared for and maintained . . . that you get maximum battery performance.

The MATERIAL HANDLING INSTITUTE'S EXPOSITION
Cleveland, Ohio
PUBLIC AUDITORIUM
1956
mhi
EXHIBITOR
Booth 1425

Always Use Gould-National Automobile and Truck Batteries

GOULD
BATTERIES
GOULD-NATIONAL BATTERIES, INC.
Trenton 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"



Cut maintenance, increase engine life with Esso AIRFIL® Coating Oil

Esso's new AIRFIL Coating Oil for diesel engine air filters has such great dirt pick-up qualities that it can substantially cut maintenance costs and increase engine life. This is possible because of the reduction in abrasive wear, lessening the need for replacements of engine parts. You, too, can profit from these benefits by using Esso AIRFIL Coating Oil in diesel air intake filters, and in air-conditioning filters.

Esso AIRFIL COATING OIL offers three important advantages:

1. Easy to apply... won't drip off. In liquid form when hot, it may be applied quickly in the desired quantity, while at normal temperatures, it is a gel-like solid that won't run off.

2. Superior wicking qualities mean a continually fresh surface is presented to the air. Successive layers of dust are rapidly wetted, keeping dirt-retaining efficiency at a maximum.

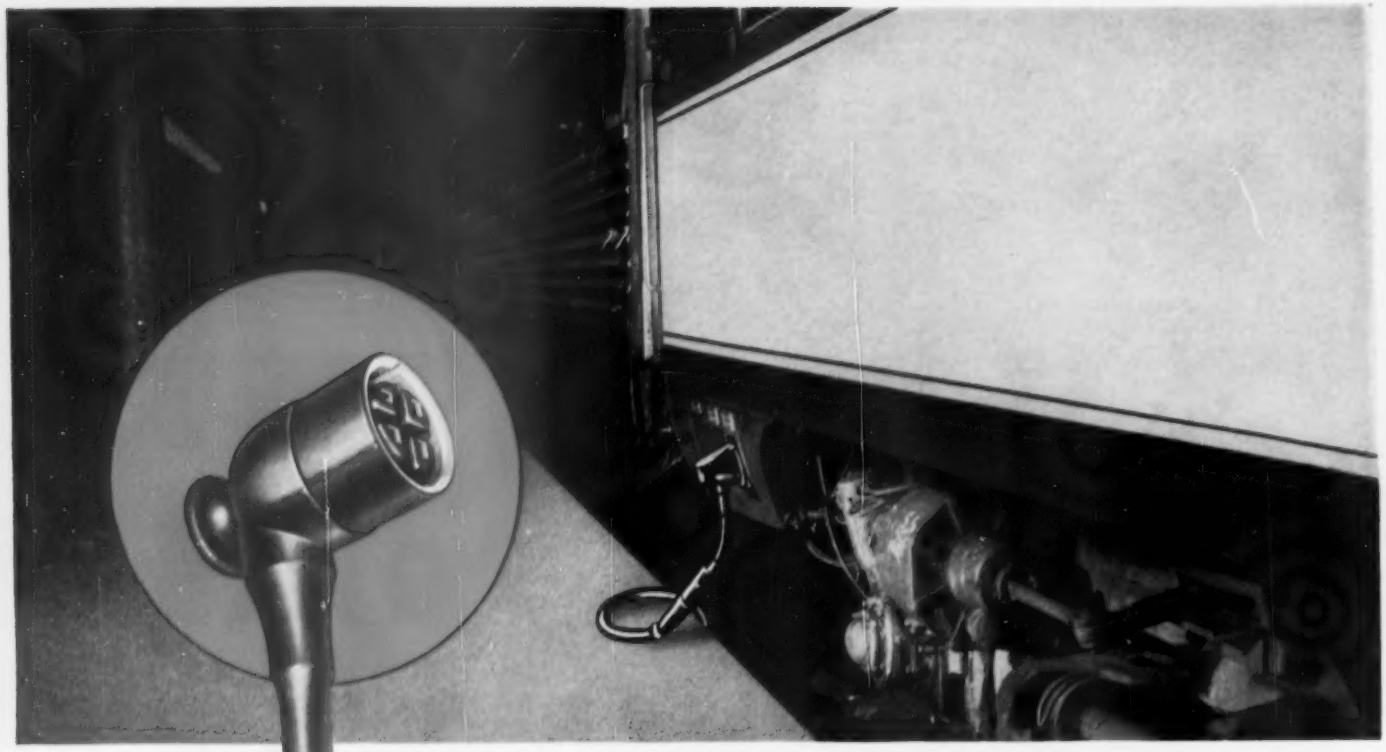
3. Insoluble in water . . . won't emulsify, and so resists removal by rain or snow, yet it can be removed quickly by hot detergent wash or steam blast.

Esso offers a complete line of dependable railroad products. Valuable years of experience in research and development, combined with continual testing on the road and in the lab, stand back of the outstanding performance of Esso Railroad products.

Esso

RAILROAD PRODUCTS

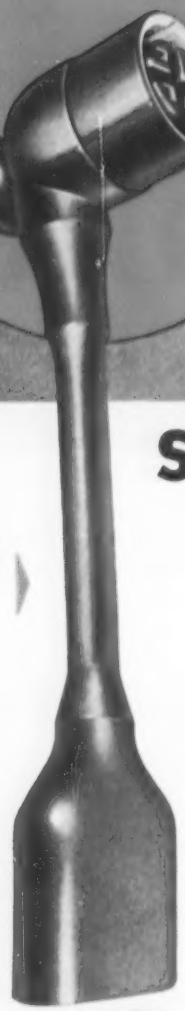
For data sheet regarding specifications of AIRFIL Coating Oil, write to Esso Standard Oil Company, Railroad Sales Division, 15 West 51st Street, New York 19, N. Y.



STOP LOOK AND BUY JOY PLUGS

FOR DEPENDABLE A.C. STAND-BY SERVICE

RIGHT-ANGLE DESIGN JUMPER with MALE MOLDED-TO-CABLE "SNAP-OUT" PLUG.



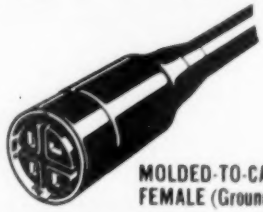
. . . There's a JOY plug and receptacle for every electrical connecting need in railway Stand-by air-conditioning circuits. Plug designs *illustrated at right* are available with or without ground. Right angle designs (left) are all grounded. Carefully designed to meet the most exacting railway requirements, these one-piece molded Neoprene connectors have never been surpassed for long-range, trouble-free service. Shatter-proof, moisture-tight, and wear resistant — they cannot crack and will not distort under normal, accidental impacts.

ATTACHABLE FEMALE PLUG (Ungrounded)

Choice of three designs

FOR 3 TYPES OF INSTALLATION

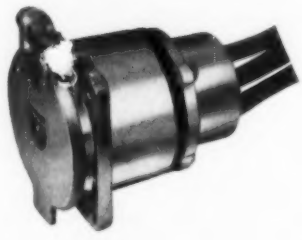
- **ATTACHABLE DESIGN . . . Equipped with screw type wiring terminals. Attach to user's cable.**
- **MOLDED-TO-CABLE DESIGN . . . Supplied on 36" long cable leads for splicing to user's own cable.**
- **COMPLETE ASSEMBLY . . . Factory molded to cable size & lengths as specified by user.**



MOLDED-TO-CABLE FEMALE (Grounded)

JOY A.C. RECEPTACLES

Have replaceable one-piece molded Neoprene/rubber inserts with insulated pigtail style wiring leads and sturdy aluminum mounting shells with self-closing, gasketed covers. Choice of flush mounting (illus.) or swiveling designs.



SNAP-OUT PLUGS

Protect expensive equipment and cable by automatically separating when train moves before disconnects are made. Choice of attachable or molded-to-cable female plugs. Male plugs supplied only in molded to cable design.

IMPORTANT:
Contacts are replaceable, in all JOY female A. C. plugs.

JOY

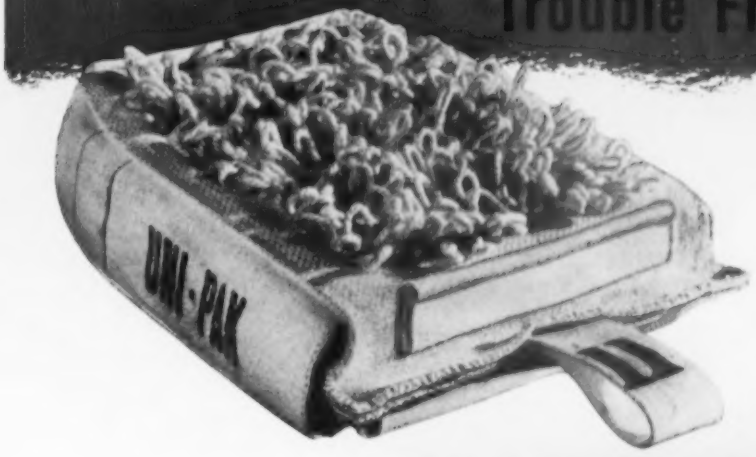
JOY MANUFACTURING COMPANY

HENRY W. OLIVER BUILDING, PITTSBURGH 22, PENNSYLVANIA

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LTD., GALT, ONTARIO

CD 356.1

UNI-PAK® LUBRICATOR *the proved performance with a high record of* Trouble Free Car Miles



Only Uni-Pak combines the quality advantages of wicking yarns and neoprene

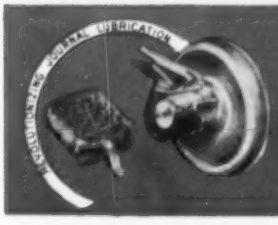
Exclusive UNI-PAK Features

1. Specially developed lubricating yarn sewn continuously through three inches of foam neoprene and terminating in non-glazing loops at top and bottom.
2. Uni-Pak's foam neoprene pad absorbs and holds more oil than other lubricators, giving maximum filtered oil to the journal.
3. Rugged cotton body increases capillary attraction. Buffers keep pad properly positioned and take up wear at fillet and collar.

145,000 UNI-PAK LUBRICATORS

now giving remarkable service on 30 roads

Write for full details about this revolutionary lubricator today



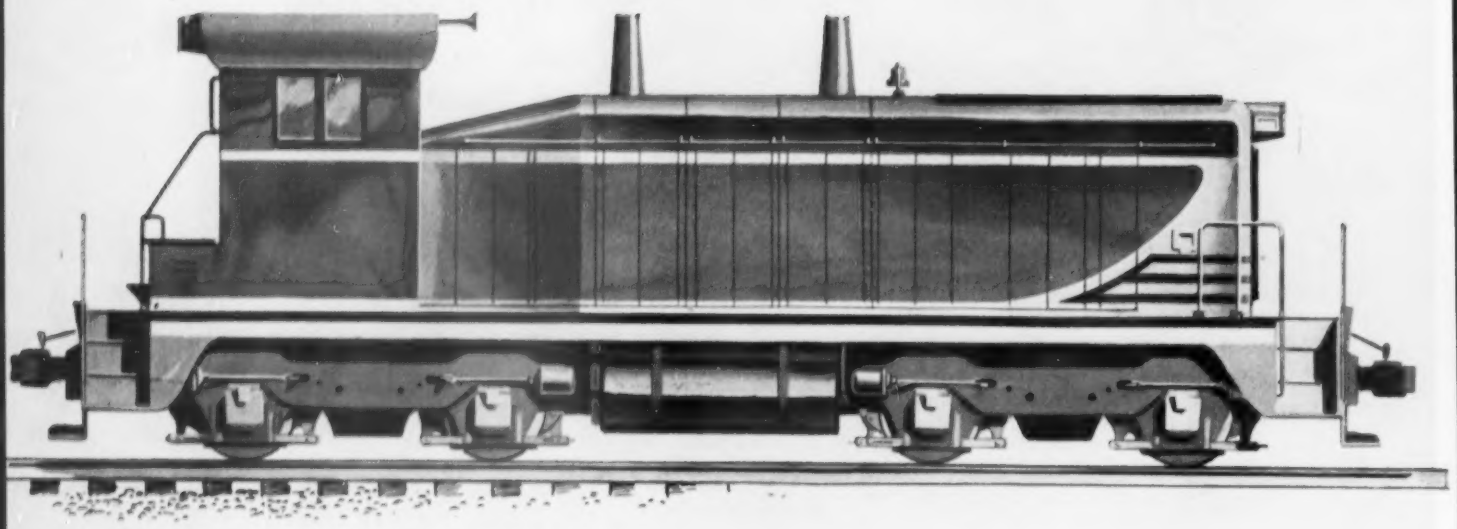
UNI-PAK CORPORATION

BOX 8302 SWISSVALE, PA.

366 MADISON AVE., New York 17, N. Y. • 120 SO. LA SALLE ST. Chicago, Ill.

Electro-Motive's NEW FLEXIBLE

equips Switching



Twelve General Motors SW1200 switching locomotives with new flexible trucks have been delivered to the Illinois Terminal Railroad, and are now in service on the line's recently de-electrified route between St. Louis and Peoria. Twenty units are being delivered to the New York, New Haven & Hartford.

Electro-Motive's new flexible cast steel switcher truck* is similar to the one used on General Motors road locomotives. It employs the patented "Flexicoil Bolster Suspension" in which the truck bolster is resiliently supported from the truck frame by two sets of coil springs which provide both lateral and vertical travel.

This optional truck gives switching locomotives riding qualities comparable to F and GP units—makes them easier on track—capable of handling freight at reasonably good speed in branch or main-line service.

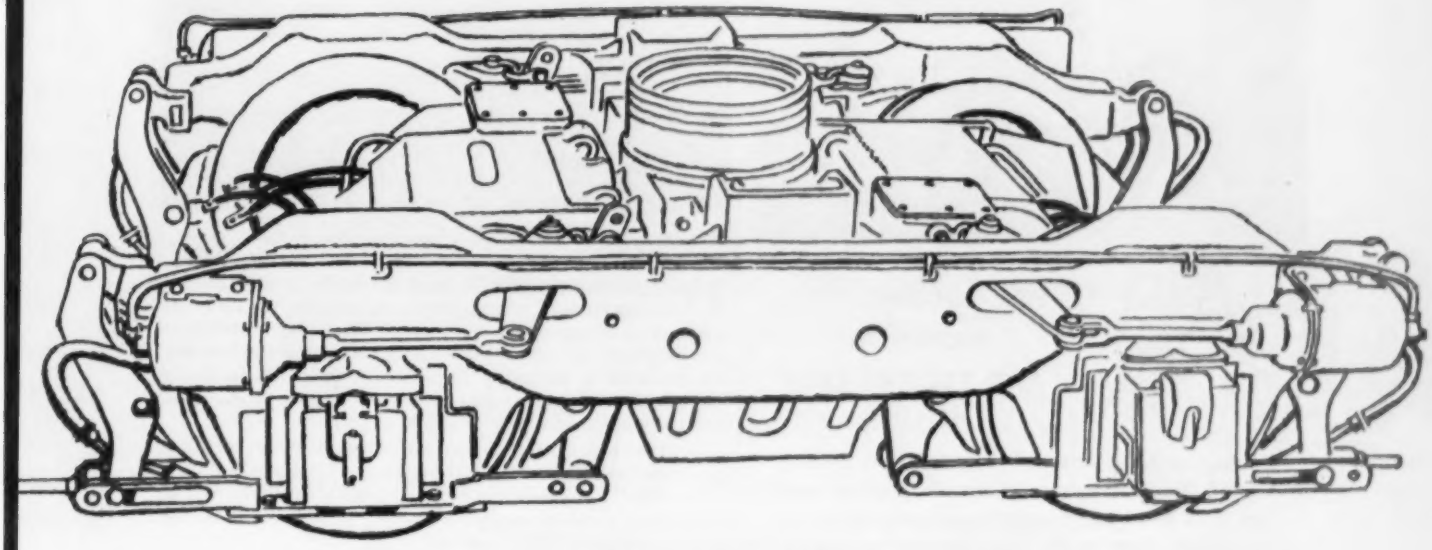
The frame is designed to use either the basic switcher plain bearing journal box or the power roller bearing journal box used on F, GP and SD type locomotives. The clasp brake arrangement is similar to that on our current F-GP truck.

Featuring interchangeability of parts with the 4-wheel Flexicoil truck, the new flexible cast steel truck is available as a replacement for the basic rigid truck on existing switchers with only minor modification of the locomotives.

For full details, write us or ask your nearest Electro-Motive representative.

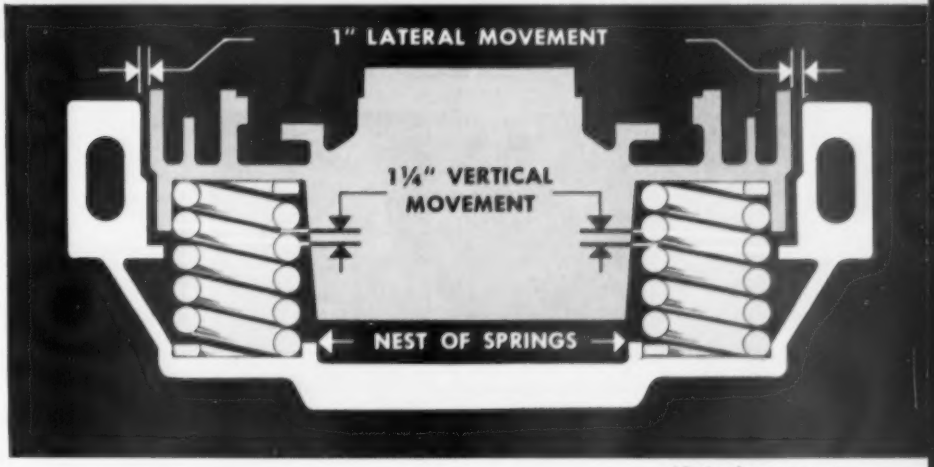
CAST STEEL TRUCK*

Locomotives for road duty



Electro-Motive's new flexible switcher truck employs coil spring suspension of the truck frame from the axle with the springs located directly over the journal box. This design eliminates the elliptic springs, coil springs and equalizer bars used in the truck frame suspension on the basic rigid trucks.

New flexible cast steel switcher truck features "Flexible Bolster Suspension" with large coil springs cushioning shock both laterally and vertically. This results in riding qualities comparable to F, GP and SD locomotives—makes switchers usable for main-line freight hauling at their maximum speed capacity. The new truck is applicable to existing switcher locomotives with only minor modifications.



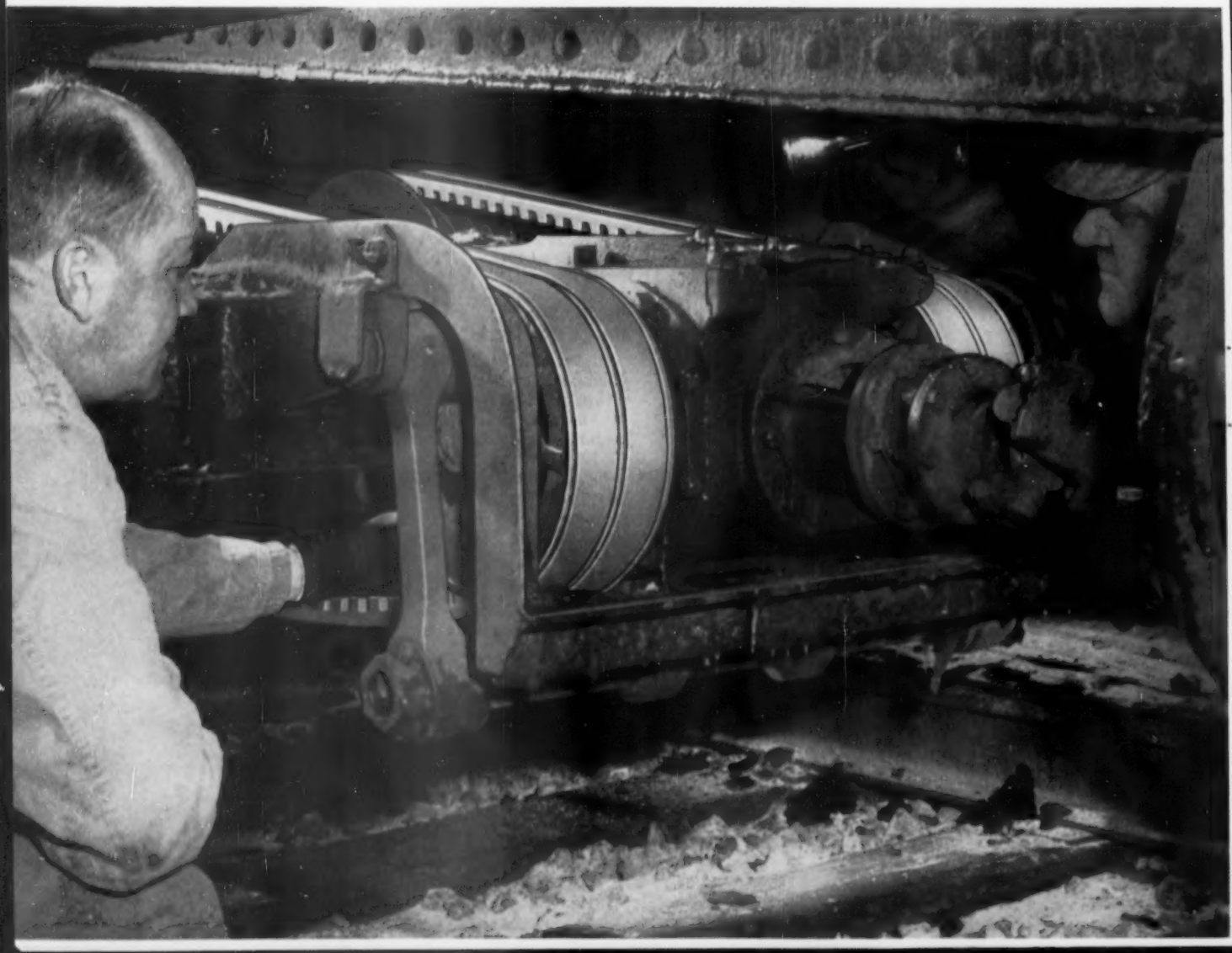
*Optional at extra cost

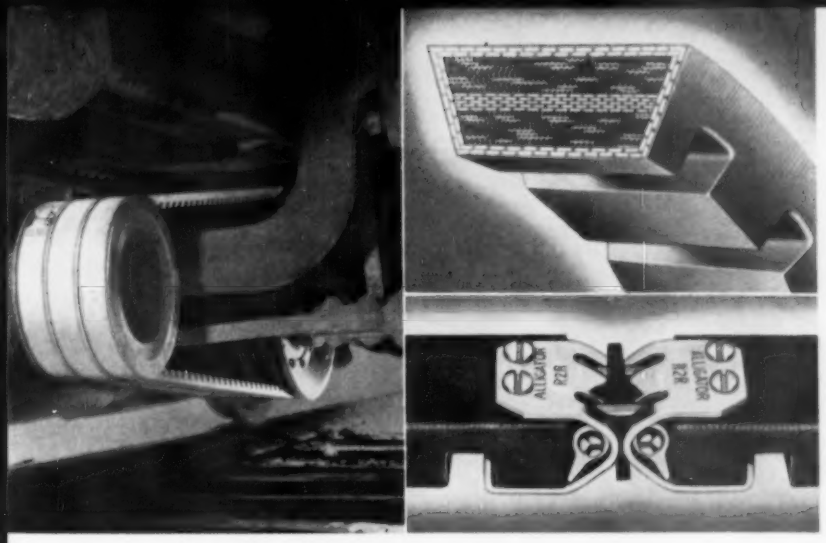
ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

La Grange, Illinois • Home of the Diesel Locomotive • In Canada: GENERAL MOTORS DIESEL, LIMITED, London, Ontario

Dayton Railway 2" Cog-Belts are original equipment on Safety V-Belt Gear Box Drives manufactured by the Safety Car Heating and Lighting Company.

The Best Connections in Modern





This belt is especially de signed for use with connector — highly resistant to pullouts For convenience and economy the Dayton 2" Cog-Belt i available in 100 foot reels

Railroading are...

Dayton 2" Cog Belts*

For Car Lighting, Heating and Air Conditioning Units, Dayton 2" Cog-Belts deliver positive power under all road conditions.

Engineered and built specifically to meet the demanding requirements of railway under-car V-Drives, rugged Dayton 2" Cog-Belts deliver power dependably and economically under the most adverse weather and road conditions.

Their high resistance to extremes of temperature, moisture, oil and dirt and their low-stretch factor reduces belt maintenance to a minimum, for exceptionally low-cost operation.

The best connections you can have between axle and driven unit are Dayton 2" Cogs. They deliver positive power, yet cushion shock loads.

An experienced Dayton Railway Engineer will be happy to advise you on the application of Dayton 2" Cog-Belts to your axle V-Drives or to help you solve any railway V-Drive problem. Just write Dayton Rubber Company, Railway Division, Dayton 1, Ohio.

*TM

Visit with us
at our exhibit
AAR Convention
June 27, 28, 29, 1956

Dayton Rubber
51 YEARS OF PROGRESS

World's Largest Manufacturer of V-Belts

Specialized Railway Representatives in New York, Chicago, Dayton, Cleveland, St. Louis, Atlanta, and San Francisco

it's Barber Stabilized trucks
AT BOTH ENDS!

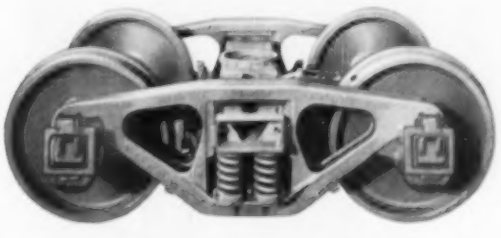
THE MECHANICAL DEPARTMENT

. . . wants easy dismantling for various servicing operations, *fast* re-assembling, *low* labor costs. Barber Stabilized Trucks . . . simple in design and efficient . . . provide these advantages.

THE TRANSPORTATION DEPARTMENT

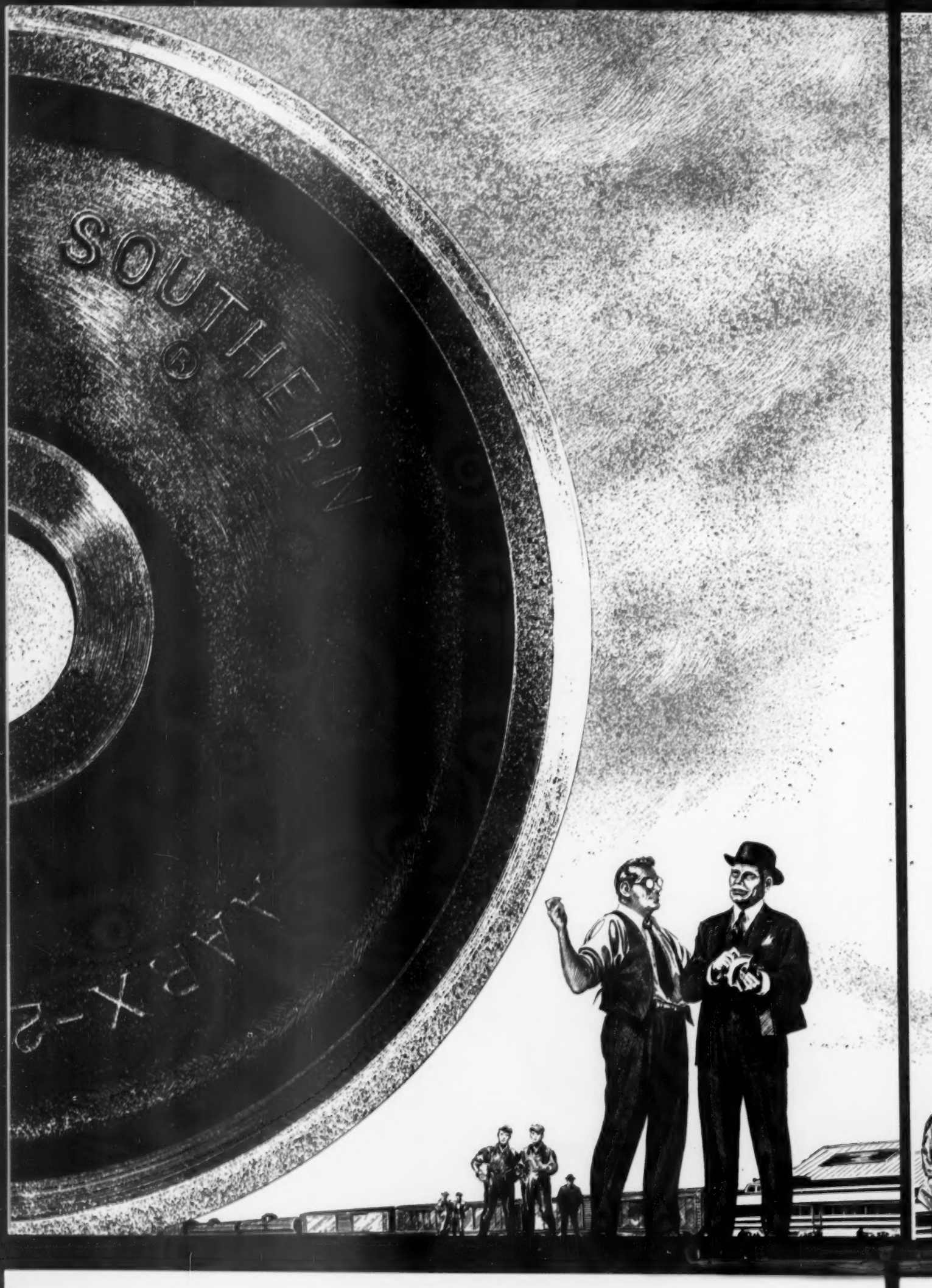
. . . wants smooth, easy rides for valuable cargoes — lowered damage claims. Transportation men want to cooperate, too, with mechanical men who *know* how Barber Stabilized Trucks save in maintenance costs. So they agree!

Specify Smoother-Riding



BARBER
STABILIZED TRUCKS

Standard Car Truck Company, 332 S. Michigan Ave., Chicago 4, Illinois. *In Canada:* Consolidated Equipment Co., Ltd., Montreal 2.


SOUTHERN

talk about
ENTHUSIASM!

Our new freight car wheel—the Southern 1.5% carbon cast steel wheel—has been on the market now for just over one year. It has had enthusiastic acceptance.* Typical statements by those using this new wheel tell the story!

Vice-President and General Manager: "Impressed by progress in developing the X-2 wheel."

Private Car Line President: "The test of this wheel which we conducted on our own cars testifies to the improved product—we agree the new wheel offers a potential for saving."

Superintendent of Car Department: "Impressed by the service performance of the Southern cast steel wheel."

Engineer of Research: "I like the quality of machining. It doesn't look like a freight car wheel."

Material Inspector: "Because all important surfaces such as tread, flange and hub face are machined, we found the accuracy of these surfaces exceptional. This is the first time we have inspected wheels which were as uniform in dimensions and otherwise."

Chief of Motive Power & Equipment: "I like your practice of having an experienced representative present during mounting of initial orders."

Wheel Shop Foreman: "Easier to bore and mount than any other kind of steel wheel."

Car Inspector: "I like the idea of using steel wheel gages when condemning these wheels. It eliminates guesswork."

Car Foreman: "The markings on the back plate make it easier for my inspectors when writing up their wheel bills."

Chief Mechanical Assistant: "We should feel assured that this wheel is being made by the most modern methods in every respect."

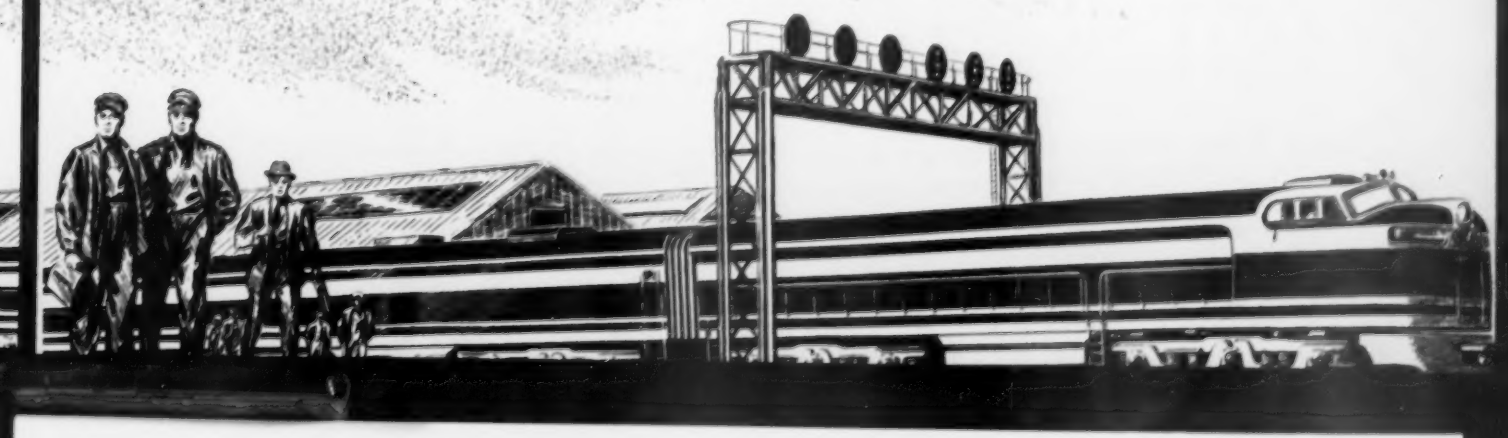
Railroad President: "It is evident you have gone into this new project in a most carefully planned and executed way."

*Over 65 different customers have ordered more than 140,000 wheels to date.

A-418

AMERICAN Brake Shoe COMPANY

SOUTHERN WHEEL DIVISION
230 PARK AVENUE
NEW YORK 17, NEW YORK



THAT MEASLY LITTLE GRIT . . .

Can and Does Chew Up Diesel Engines

WIX makes a "big production" out of a little destruction . . . but that "little destruction" can add up to *millions* of *your* dollars!

Contamination in fuel and lubricating oil is a continuing problem. You can trace the service life and performance pattern of your diesel engines in direct relation to the cleanliness of lube and fuel oil and see exactly how important engineered filtration is to you!

WIX Oil Filter Cartridges are the product of objective research and engineering. They do a superlative job of keeping oil clean. They represent a solid form of insurance against excessive downtime, maintenance cost and engine wear.

Write for the WIX Railroad catalog. It has a definite answer for *you.*

wix®

ENGINEERED FILTRATION

WIX CORPORATION • GASTONIA • N. C.

WIX ACCESSORIES CORP. LTD., TORONTO, ONT., CANADA

Warehouses:

GASTONIA • NEW YORK • ST. LOUIS • DES MOINES • SACRAMENTO

WIX Lubricating Oil Replacement Cartridge with positive end seals—filtrant packed by volume-density method—reinforcing spring inside die slotted, machine formed center tube.

It's easy to

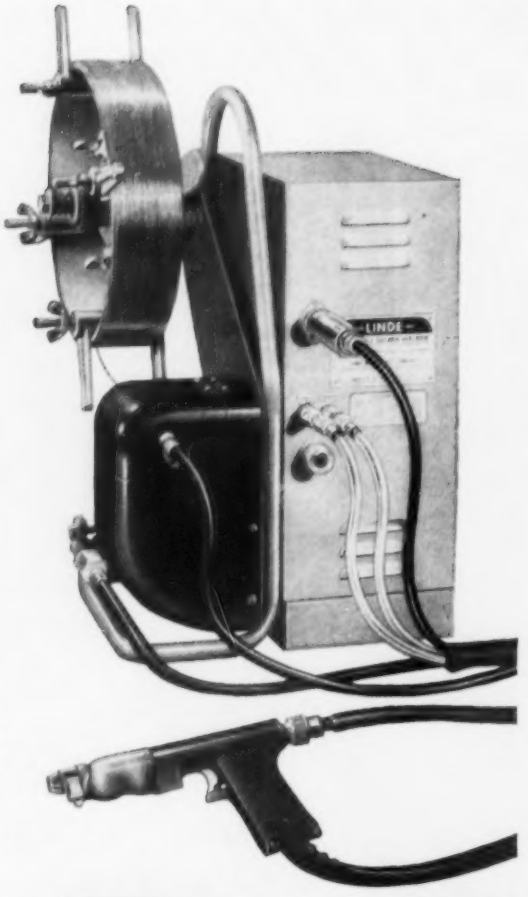
CUT WELDING COSTS

when you use a High-Speed

LINDE SWM-2

Trade-Mark

Portable Sigma Welder



Your welding department can easily make high-speed, low-cost fusion welds in aluminum, stainless steel, high temperature alloys, copper, carbon steel, and other metals with the LINDE SWM-2 Portable Sigma Welder. The LINDE SWM-2 is a complete control unit for manual sigma (Shielded Inert Gas Metal Arc) welding operations. It mechanically feeds welding wire from a coil into the weld area at a steady precontrolled rate and supplies a regulated quantity of argon to shield the weld from contamination by the atmosphere. No flux is used. In most cases the smooth, clean sigma welds need no post-welding treatment.

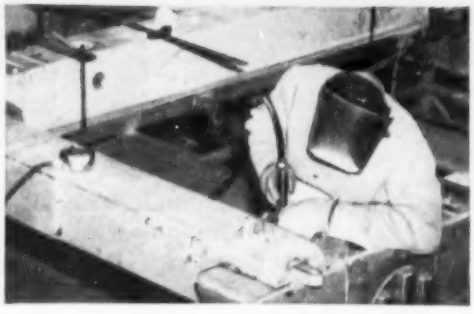
SIMPLIFIED AUTOMATIC OPERATION

The operator merely presses the trigger of the pistol type torch to energize the control circuit and start the flow of water coolant and argon gas. When an arc is struck by touching the consumable electrode to the workpiece, the wire feed automatically begins.

NEW CONSTANT POTENTIAL POWER SUPPLIES CAN BE USED

Either ordinary or constant potential DC power supplies can be used with a LINDE SWM-2. In constant potential welding arc voltages are preselected and held with outstanding consistency which permits positive starts and high-speed welds on thin metals.

Call your nearest LINDE office today for more information on how you can cut production welding costs with the LINDE SWM-2 Sigma (Shielded Inert Gas Metal Arc) Welder. Or write for your free LINDE SWM-2 catalog.



Production jumped 300% when the Heller Engineering and Manufacturing Company, Lynwood, California changed to sigma welding to fabricate aluminum engine shipping stands. Because the sigma welds were clean and sound, post-welding treatment was practically eliminated.

RAILROAD DEPARTMENT

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

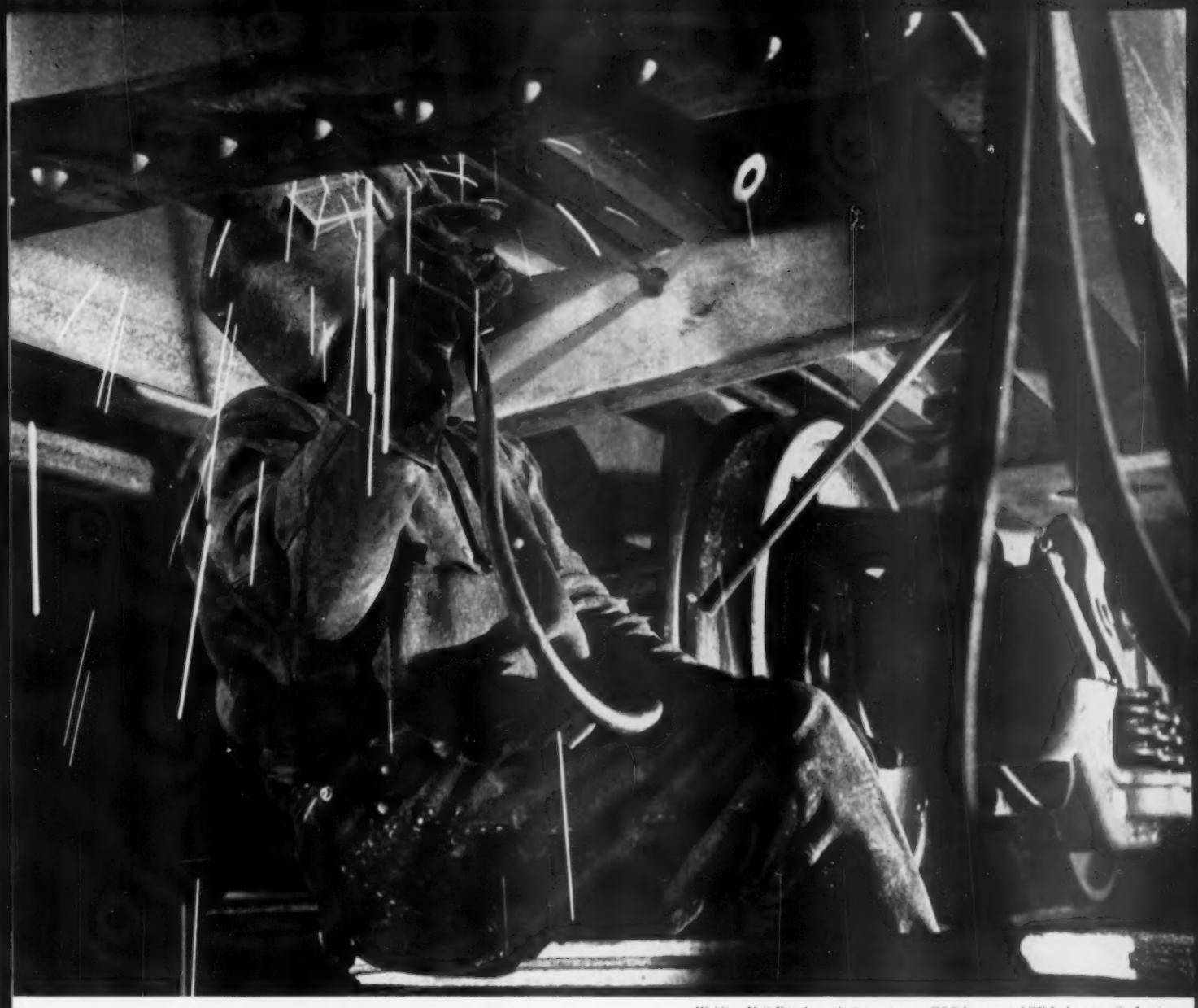
In Canada: LINDE AIR PRODUCTS COMPANY

Division of Union Carbide Canada Limited, Toronto

(formerly Dominion Oxygen Company)

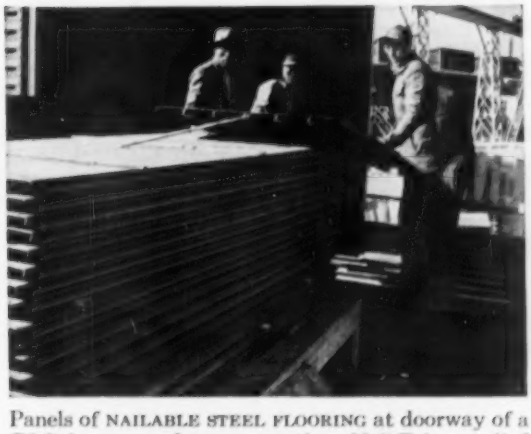
The term "Linde" is a registered trade mark of Union Carbide and Carbon Corporation.

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol - - -



Welding N-S-F to the underframe in new C&O boxcar at ACF Industries, St. Louis.

N-S-F* helps THE C&O BUILD FOR THE FUTURE



Panels of NAILABLE STEEL FLOORING at doorway of a C&O boxcar under construction. N-S-F is supplied in panels for quick, economical installation.

With cars equipped with NAILABLE STEEL FLOORING, progressive railroads can furnish shippers with Class A cars for all kinds of lading. And, moreover, this modern flooring—in both new and used freight cars—can effect considerable savings over the years in both original investment and maintenance costs.

Up-to-date performance and cost studies are available from our representatives in Atlanta, Chicago, Denver, Montreal, New York, Omaha, Philadelphia, St. Louis and San Francisco.

* N-S-F—NAILABLE STEEL FLOORING

Made and sold only by

STRAN-STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A unit of

NATIONAL STEEL CORPORATION

55-SS-4A

...outlasts ALL other insulating materials!

The installation of Streamlite HAIRINSUL into new refrigerator cars is a one-time investment, because it outlasts the life of the car, and can be used again and again.

The successful use of all-hair HAIRINSUL in refrigerator cars for half a century is the best testimony that service conditions never impair its high insulating efficiency.

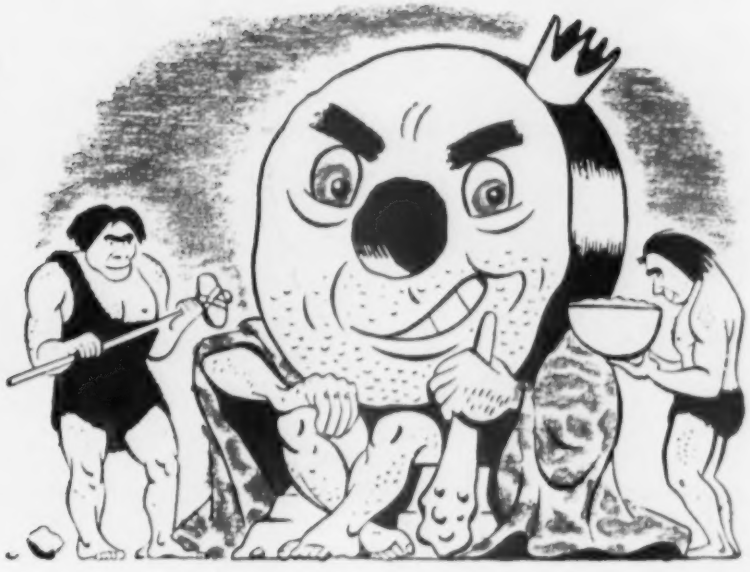
Some of the major reasons why Streamlite HAIRINSUL is specified by leading refrigerator car lines are given at the right. Write for complete data.

AMERICAN HAIR & FELT COMPANY
Merchandise Mart • Chicago, Illinois

- **LOW CONDUCTIVITY** — Thoroughly washed and sterilized, all-hair heat barrier. Rated conductivity — .25 btu per square foot, per hour, per degree F., per inch thick.
- **LIGHT WEIGHT** — Advanced processing methods reduce weight of STREAMLITE HAIRINSUL by 40%.
- **PERMANENT** — Does not disintegrate when wet, resists absorption. Will not shake down, is fire resistant and odorless.
- **EASY TO INSTALL** — Blankets may be applied to car walt in one piece, from sill to plate and from one side door to the other. Self-supporting in wall section between fasteners.
- **COMPLETE RANGE** — STREAMLITE HAIRINSUL is available ½" to 4" thick, up to 127" wide. Stitched on 5" or 10" centers between two layers of reinforced asphalt laminated paper. Other weights and facings are available.
- **HIGH SALVAGE VALUE** — The all-hair content does not deteriorate with age; therefore has high salvage value. No other type of insulation offers a comparable saving.

SETS THE STANDARD BY WHICH ALL OTHER REFRIGERATOR CAR INSULATIONS ARE JUDGED

136

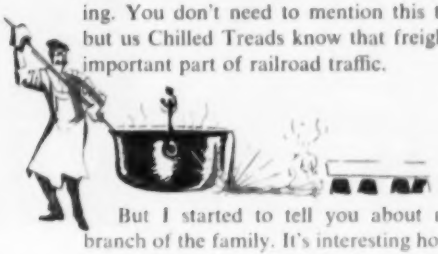


We wheels have come a long way!

My name is TOUGH GUY. I come from a pretty important family—the Wheels. All us Wheels go back to ancient times. We are recognized as one of mankind's oldest inventions, and among the most important to civilization.

Of course we Wheels have come a long way since those days, though I don't know whether civilization has or not. Today there's mighty few machines that don't depend on wheels in one way or another.

Transportation is my specialty. My branch of the family does the heavy work. We are the Chilled Tread Car Wheels, and we specialize in keeping freight rolling. You don't need to mention this to passengers, but us Chilled Treads know that freight is the most important part of railroad traffic.



But I started to tell you about my particular branch of the family. It's interesting how chilled iron was discovered. In England it was, and some bloke lets molten iron spill over the ladle and down on the floor. Well, you know foundries—there's always a hunk of iron lying around. So this hot iron spills and part of it runs against the cold iron.

After it had cooled somebody noticed that the spilled iron that touched the cold iron was white, and extremely hard. That's how chilled iron was born.

Not long after that a fellow by the name of Richard Trevithick got the idea of putting a steam engine on wheels and hauling cars along tracks, or rail-roads. The iron horse had to have iron wheels, and by 1818 an ingenious foundryman had applied the chilled iron idea to railroad car wheels.

From the first we Chilled Tread Wheels did all right, even the rather crude models. You see, we are made of high-grade controlled iron, and we are poured into a flask made up of molding sand with a metal ring around it. When the molten iron strikes this cold ring it creates hard white iron around my entire tread. That chill goes in about an inch, and the rest of the iron cools normally, and so is ductile, resilient, tough, but relatively much softer.

So you see I'm hard treaded to resist wear from the rails and the brake shoes. I'm tough and strong enough to take shock in my center portion, or plate. And at heart I'm a softie—my hub is easy to machine and fits real snug to the axle.

I guess that's why railroad men like me.

* * *

In addition to the advantages inherent in chilled car wheels, as explained by TOUGH GUY, other advantages, such as low cost, improved safety records, and quick delivery from the nearest AMCCW plant, assure a permanent place for chilled car wheels in modern railroad equipment.

Association of Manufacturers of Chilled Car Wheels

445 North Sacramento Boulevard, Chicago 12, Illinois

Albany Car Wheel Co.
Southern Wheel (American Brake Shoe Co.)
Griffin Wheel Co.
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7 G-E replacement parts for better locomotive operation...

1. G-E CONTACT PARTS get final check with "go-no-go guage" to assure perfect fit. Tips are carefully checked because improper fit causes burning and damage to other parts of your contactors.

How General Electric Contacts Are Built to Cut Road Delays

When you buy contacts for the control system of your locomotives, you should also be buying *fewer road delays*. That's why your best buy in contact parts is G.E.

These General Electric renewal parts will give you the peak performance you want for two important reasons:

1. They are built of the same high-grade materials as those used in the original equipment. Result is positive electrical contact, minimum mechanical wear, *fewer road delays*.

2. They are built to the same dimensions as the original equipment so you get proper fit without filing. Result is proper alignment, which eliminates excessive heat on contact surfaces, a major cause of road delays.

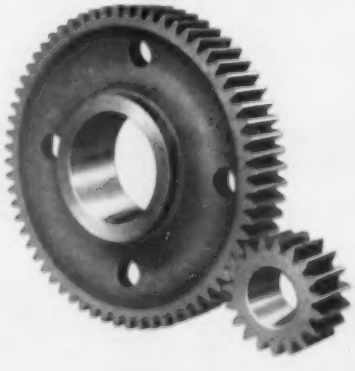
To get the performance you originally bought, always specify genuine G-E contacts. Locomotive & Car Equipment Dept., General Electric Co., Erie, Pa. 128-27

Progress Is Our Most Important Product

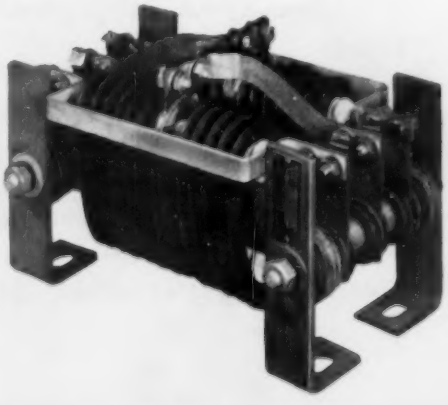
GENERAL ELECTRIC

2. G-E RECOMMENDED CARBON BRUSHES are selected for the proper degree of hardness and grain structure to minimize wear and tear on commutator surfaces of your unit.

3. G-E GEARING is designed and quality-control manufactured to carry the heavy starting loads and take the running shock loads encountered in today's heavy railroad service.



4. G-E RESISTORS have floating steel backbones that expand and contract freely with high temperature changes and therefore are not subject to harmful buckling forces.

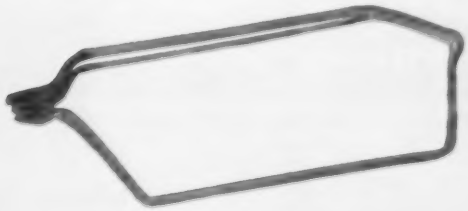


ON THE TESTING LINE—COMPLETED CONTACTS UNDERGO RIGID INSPECTION TO ASSURE YOU OF TOP LOCOMOTIVE PERFORMANCE.

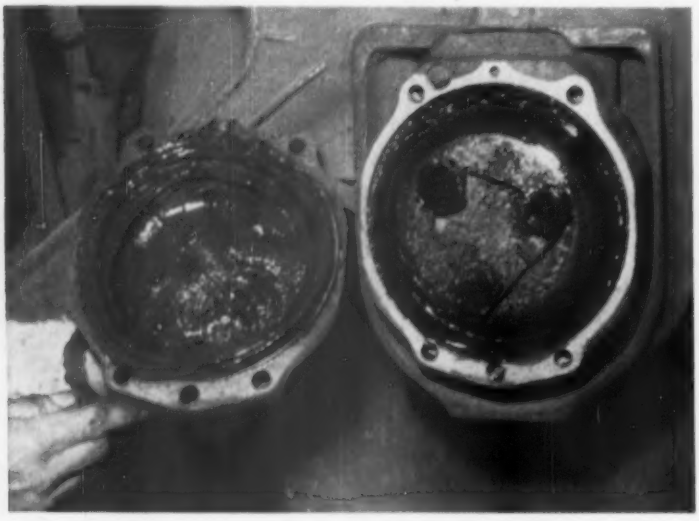
5. G-E COMMUTATORS retain smoothness in rigorous service because high-speed, high-temperature seasoning process sets segments firmly in place, cuts down friction wear and tear.

6. G-E ARMATURE COILS are available as part of complete rewind kits for your convenience. Every coil is dimensionally accurate and quality insulated for longer life.

7. G-E MOTOR SUSPENSION BEARINGS give you longer service life — have a built-in *oil-return* feature which can save up to $85.00 of operating costs per locomotive unit each year.



IN THE LAB: Engineers test *Texaco 979 Roller Bearing Grease* at Texaco's Beacon Research Laboratories. This 7-ton test machine can operate at speeds up to the equivalent of 100 m.p.h., apply up to 50,000 pounds vertical and 15,000 pounds horizontal loads — can be made to duplicate or exceed actual road service conditions.



ON THE ROAD: Texaco Systematic Engineering Service keeps an eye on lubricant performance. This freight car roller bearing was photographed after two years and 85,149 miles of special test service. Note that *Texaco 979 Roller Bearing Grease* has retained its original consistency and bearing is still fully packed — good for at least another year before relubrication.

TEXACO 979 Roller Bearing Grease proves best

TEXACO 979 ROLLER BEARING GREASE is one of the original AAR-approved greases for journal roller bearings. Tests in Texaco Laboratories, tests by leading bearing manufacturers, and millions of miles of actual service on leading railroads — all prove its superiority.

As the photos show, *Texaco 979 Roller Bearing Grease* retains its consistency in prolonged severe service. It does not soften excessively, hence strongly resists leakage and stays in the bearing—assuring better lubrication, longer lasting protection, longer bearing life and lower maintenance costs.

Let a Texaco Representative explain how you can benefit through the use of Texaco Railroad Lubricants and Systematic Engineering Service. Just call the nearest Railway Sales Office in New York, Chicago, San Francisco, St. Paul, St. Louis or Atlanta. Or write The Texas Company, *Railway Sales Division*, 135 East 42nd Street, New York 17, New York.

TEXACO **TEXACO Railroad Lubricants** AND SYSTEMATIC ENGINEERING SERVICE — IN ALL 48 STATES

TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE on television Saturday nights, NBC.

EDITORIAL . . . . . .

Why Can't the Railroads Keep Good Men?

The relationship of the college man to the railroads is more of a problem today than it was twenty or thirty years ago. Then the college man found himself in the difficult position of trying to sell himself to the railroad industry. Today, the railroad industry is finding itself in the difficult position of trying to sell the college man to the fact that there is a real future for him in the industry.

The underlying facts actually haven't changed very much with the passage of years, and the evidence of it is the following quotation from a 30-year-old letter to the editor on this subject:

"Apparently one of the real problems to be solved in this question of improving the relations of the college man and the railroads is to make it possible for the technically educated young man who would enter railroad service to know before he starts in just what a railroad is, how it is run, and what the demands really are.

"A graduate from an engineering school who anticipates a railroad career should carefully consider two questions which are applicable to engineering work in any field; namely, 'Do I want to use my engineering education as a basis for a purely engineering career, or do I want to use it, together with a supplementary business education, as a means of eventually reaching an executive position?'

"The man who is interested in engineering work for the work itself is sure to suffer a disappointment in railroad service. . . . Some engineers are primarily interested in new design and construction. Unfortunately, relatively little of the work performed by the average railroad engineering office is of a nature that will keep such a man continuously occupied with new and interesting problems. On the other hand, if the college man entering railroad service is the type who wishes to use his engineering education as a means of reaching an executive position either in or above the engineering department, then there is one thing that cannot be overlooked —that an engineer, as such, is an engineer only up to a certain point, beyond which he gradually becomes more of a business man and less of an engineer. If, up to that point, he has failed to educate himself in the principles of business the chances for becoming an executive are not great."

It can be seen from the foregoing quotation, taken in part from the Railway Age in 1926, that the situation with respect to technically trained men is not greatly different today than it was years ago. The difference is that the opportunities for an engineering graduate have multiplied so many times over what they were only a few years ago that the railroads find themselves in stiff competition with other industries for men.

To the man who knows what he wants to do and has a real goal the chances of attaining a position of importance and satisfactory remuneration are just as great in the railroad industry as elsewhere.

A rather casual survey of the situation in the mechanical department at this time reveals the fact that, while it is not possible for the average railroad to secure all of the technical graduates they would like to have, they are able to sign on a satisfactory number. The real difficulty, so we are told, is that on many railroads there is a loss of as high as 50 per cent in five or six years. Any industry, railroad or industrial, that has trained a man for five or six years has probably invested 50 or 60 thousand dollars in that individual, and a 50 per cent loss is serious, indeed.

Why do the railroads lose these men? Our questioning reveals that it is not necessarily lack of future opportunity or adequate compensation. Actually, the railroads are offering starting salaries comparable with other industries. Two things seem to stand out in the replies of almost everyone we talked to—long hours and the necessity of frequent changes of location.

Most railroad men accept long hours as a necessary part of a railroad job and they see no reason why new men coming into the industry should look at it any differently than they do. Unfortunately, this isn't true. Railroad men offer as justification for long hours the fact that a railroad has to run 24 hours a day, seven days a week. To quote one "outsider," the railroads have no monopoly on 24-hour operation as evidenced by the fact that communications, radio, television, air transport, highway transport all operate on the 24-hour basis and, yet, we are told, men in the higher supervisory and management positions still have some time they can call their own. This is an important factor in the competition for men, all other things being equal.

Take the change of location, for example. One technical graduate who had reached the position of general foreman said he had been required to move four times in five years and that, while the railroad had paid his actual moving expenses, he had lost $3,000 as the result of the four moves, not to mention uprooting his family connections each time it was done. This, especially to a young man who may have been in the service is an important consideration. Having wandered around the world for a few years, he likes to stay put for awhile and still get ahead. Is it a consideration of railroad service that this can't be done?

The foregoing is not only a matter of opinion; it is a reporting of facts and, if among our readers there are those who can put forth sound reasons why a young technical graduate should look to the railroad industry for future opportunity, the industry can certainly use the information. We will be glad to disseminate it!

"We're looking for customers who want rugged SPRINGS"

This ALCO coil spring has just been wound hot to take tough, grueling punishment. It's been manufactured to meet a customer's specific requirements.

Your service requirements for springs, no matter how tough, can be met by ALCO. If you wish, ALCO specialists are available to confer with you in the selection of a proper spring for any service. You know in advance that you're getting springs that are designed for your job. Springs that work right, fit right and reduce maintenance and replacement costs.

The next time you buy springs, let ALCO prove this performance. ALCO springs include helical compression or extension, torsion, elliptical, volute, flat, belleville disc and many other special types. Contact your nearest ALCO sales office or write P.O. Box 1065, Schenectady 1, N. Y.

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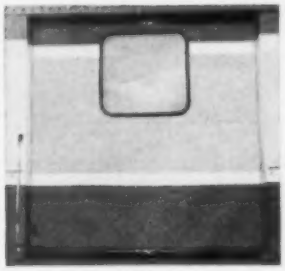
BAGGAGE AND POSTAL CAR DOORS



Completely weatherproof Met-L-Wood doors effectively prevent internal rust and rot... and their tough, smooth surfaces stay new-looking for years. Stainless steel channels along bottom edges of sliding doors are rustproof... virtually wearproof. All-rubber window sash installed or removed in minutes... rattleproof... water- and weatherproof. Available in full width and split types ... sizes to meet all needs.

Exclusive Split Door Seal

Drawing above shows simple Met-L-Wood Split Door Seal which assures weather- and watertightness for years of continual use. Seal also provides effective cushion when closing split doors.

PASSENGER CAR END, VESTIBULE, INTERIOR DOORS

Sound-deadening, insulating, vibration-damping Met-L-Wood doors for passenger cars add to service life, cut deadweight . . . Combine modern, clean-line beauty with great strength and durability. Furnished for manual or automatic operation, with or without hardware assembly. Tapping plates for hardware are built into doors . . . invisible additions to strength and trouble-free service life. Sizes and types to fit all requirements . . . exact dimensions insure quick assembly and perfect fit. Door thicknesses from ½" up, as required.

CABOOSE DOORS

Met-L-Wood caboose doors are built to last the life of the caboose—and to give trouble-free service the whole time. Weather-proof, warp-proof, rot-proof doors can be provided with or without stationary windows in all-rubber sash or with standard drop sash. Available with or without hardware. In all sizes to exactly meet specifications.

DIESEL LOCOMOTIVE DOORS

Widely used by builders on new locomotives, Met-L-Wood doors guarantee trouble-free operation of end and interior doors on diesel road locomotives and cab doors for diesel switchers. Furnished to exact dimensions, with or without windows; either with hardware installed, or with tapping plates placed for hardware assembly on the job.

Write for this Bulletin

Met-L-Wood Bulletin 520 gives the complete, illustrated story on Met-L-Wood doors for railroad uses ... shows construction details, describes standard and special types and sizes. Your copy sent free upon request—write for it today.

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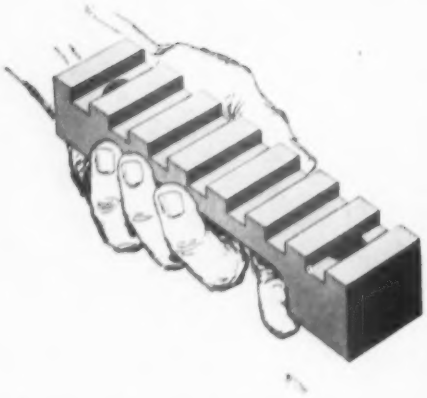
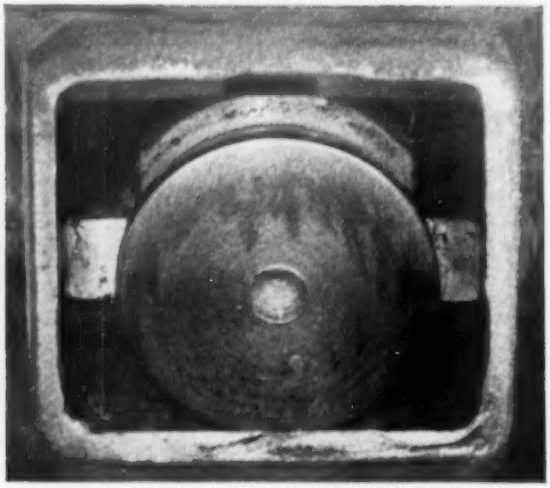
MET-L-WOOD • *STRONG... LIGHT... Smooth Finish... Sound Deadening... Fire-Resisting... Insulating*

Improve the efficiency of any journal lubricator with Magnus R-S JOURNAL STOPS



Longer bearing life and lower maintenance costs for trucks and journal boxes also yield big return on initial R-S Journal Stop investment



Here's proof of Journal Stops' unique ability to hold packing in place even under extreme service conditions. This unretouched photograph shows the interior of a Journal-Stop-equipped box after undergoing an 11½ mph flat-switching impact test. Waste is still firmly seated under the journal.

WITH conventional waste packing and Magnus R-S Journal Stops, you can run freight cars for *three years* between periodic servicing. That's been established by test experience to date.

Bolted to both sides of the journal box, the bronze bearing-metal Journal Stops form a permanent, built-in waste "container" that holds the mass of packing right where it belongs, even under severe braking and impact forces. And, unlike any other waste container or retainer, by keeping the bearing on the journal, you prevent short strands from being trapped beneath the bearing crown. By restricting fore-and-aft movement of the journal within the box, they prevent squashed-down waste packs, maintain constant journal-to-packing pressures, assure a uniform feed of oil to the bearing and *eliminate danger of waste grabs.*

But that's not all. You also get longer bearing life and freedom from spread linings. You reduce the requirements for an effective box rear seal and increase the efficiency and service life of present dust guards and seals. That's vital to the successful operation of most waste substitutes.

Pad and mechanical lubricators benefit too. By keeping the journal in its proper position, you keep the box from rising during impacts and braking—don't crush the lubricator or seal. Axle dust guard seats can't be scored either.

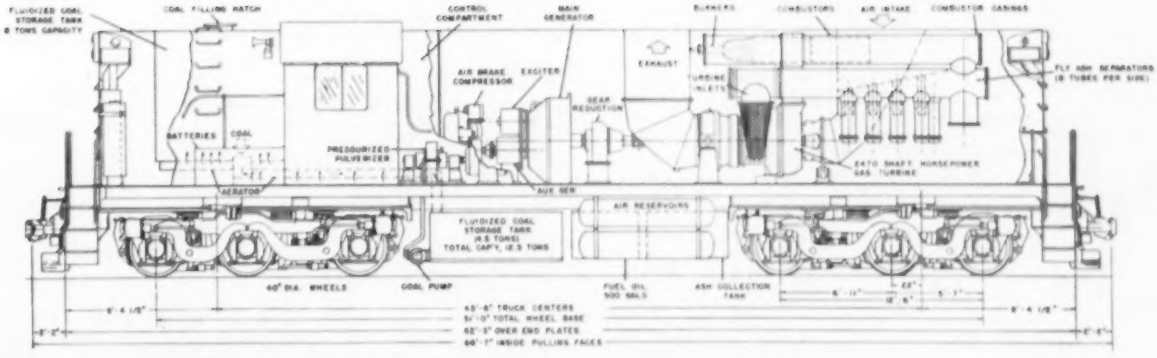
WHAT ABOUT COST? One private car line estimates it has recovered more than 90% of the total cost of Stops and installation in just the first 20 months of operation. Other roads report comparable savings. R-S Journal Stops not only pay for themselves in reduced maintenance costs. They get cars to destination with trouble-free journal boxes. Write for complete information. Magnus Metal Corporation, 111 Broadway, New York 6 or 80 E. Jackson Blvd., Chicago 4.

MAGNUS

Solid Bearings

MAGNUS METAL CORPORATION

Subsidiary of **NATIONAL LEAD COMPANY**



GAS TURBINE installation replacing the diesel engine in an Alco DL600 road switcher would produce a 2,500-hp locomotive. Part of the fuel would be stored in space provided for steam generator on this unit.

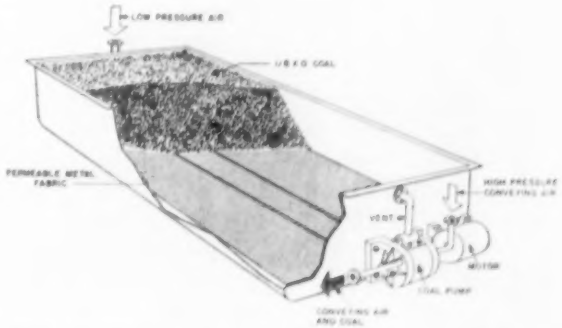
Coal-Fired Gas Turbine Locomotive Makes Progress

LDC expects to begin building the actual locomotive by 1957, ending more than eleven years of laboratory work

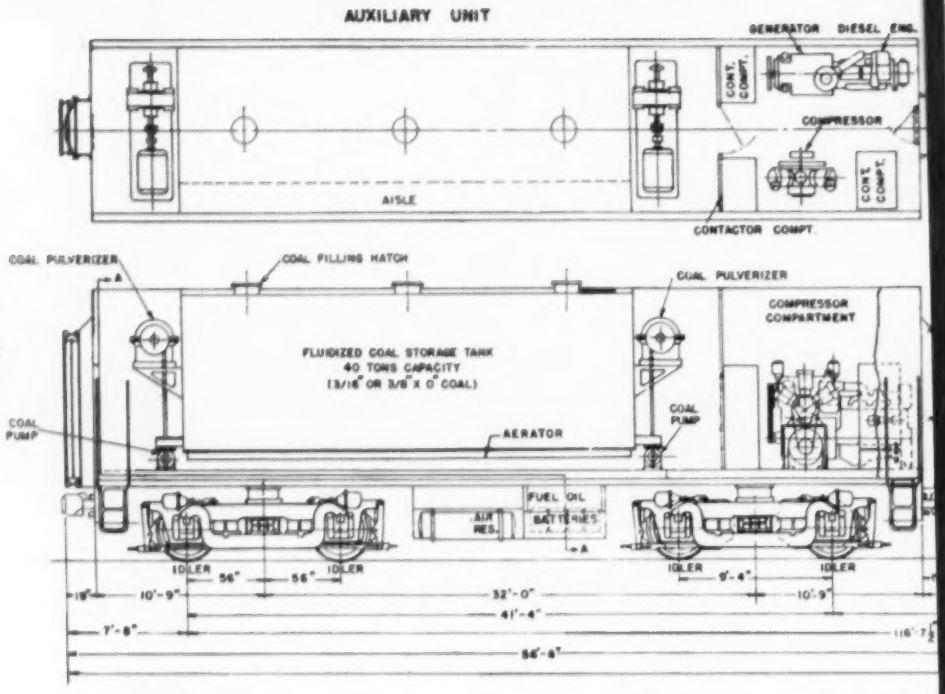
Eleven years of research have yielded a coal-fired gas turbine combustion system which has operated satisfactorily under extended high load tests and in locomotive type service. Actual building of the world's first coal-fired gas turbine locomotive is expected to be under way in 1957 according to Col. R. B. White, Chairman of the Locomotive Development Committee. Original economics which initiated the coal-fired gas turbine project have not changed. Roads that originate bituminous coal on their own lines pay approximately 20 cents per million BTU including on-line charges. Diesel fuel averaging approximately 10.8 cents per gallon for LDC member roads costs approximately 83 cents per million BTU. The turbine has successfully burned a variety of different coals. White's announcement revealed that it is expected the research program will be concluded at Dunkirk this year after doing some additional work on coal handling, combustion and ash separation.

Tests run during the latter half of 1954 showed that the ash separation equipment developed at Dunkirk could protect a gas turbine from fly-ash erosion. The Committee then authorized a series of continuous high load tests and 600 hours of coal-fired operation as the operating program for 1955. During the course of the 1955 high-load tests, the Union Pacific became interested in the program. Although not a member of LDC, the UP supplied Wyoming coal and the LDC tested this fuel in the Dunkirk plant. In addition to continuous high loads, actual locomotive loading cycles for the New York Central, Union Pacific and Norfolk & Western were used as the basis for nearly half of the plant operating time.

As an example of the continuous high-load operation, the plant operated from 2:44 pm on February 21 until 7:41 pm on February 23 at an average load above 3,600 hp—a load factor of 102 per cent. During the thirteen days following March 21st, the plant was operated for 233 hours at an average load of 3,400 hp—96 per cent of the turbine's rated 3,540 hp capacity—and did this with a thermal efficiency of 20 per cent. High load testing



COAL BUNKER with permeable metal fabric bottom would be one part of the complete fluidized coal-handling system on the gas turbine locomotive.



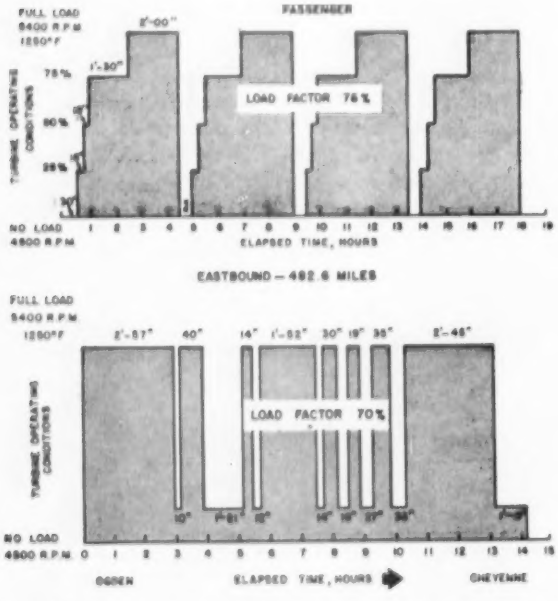
PRESENT LDC gas turbine could be installed on a six-motored A-unit with fuel handled on a C-unit tender. Rated at 3,600 hp, the locomotive would have fuel for 30 hours of operation. A 7,200-hp locomotive could be obtained by coupling a second A-unit at the rear.

consumed 1,413 tons of coal in 852:37 hours at a cost of $6,710, when adjusted to include average on-line railroad handling charges. No lubricating oil was added during the entire 1955 operation. If this average load of 3,200 hp had been carried by diesel engines for 852:37 hours, LDC reports these engines would have consumed 167,000 gal of diesel oil and 2,000 gal of lubricating oil at a total cost of $18,870. This figure is based on the average cost of diesel fuel to LDC members during the first six months of 1955.

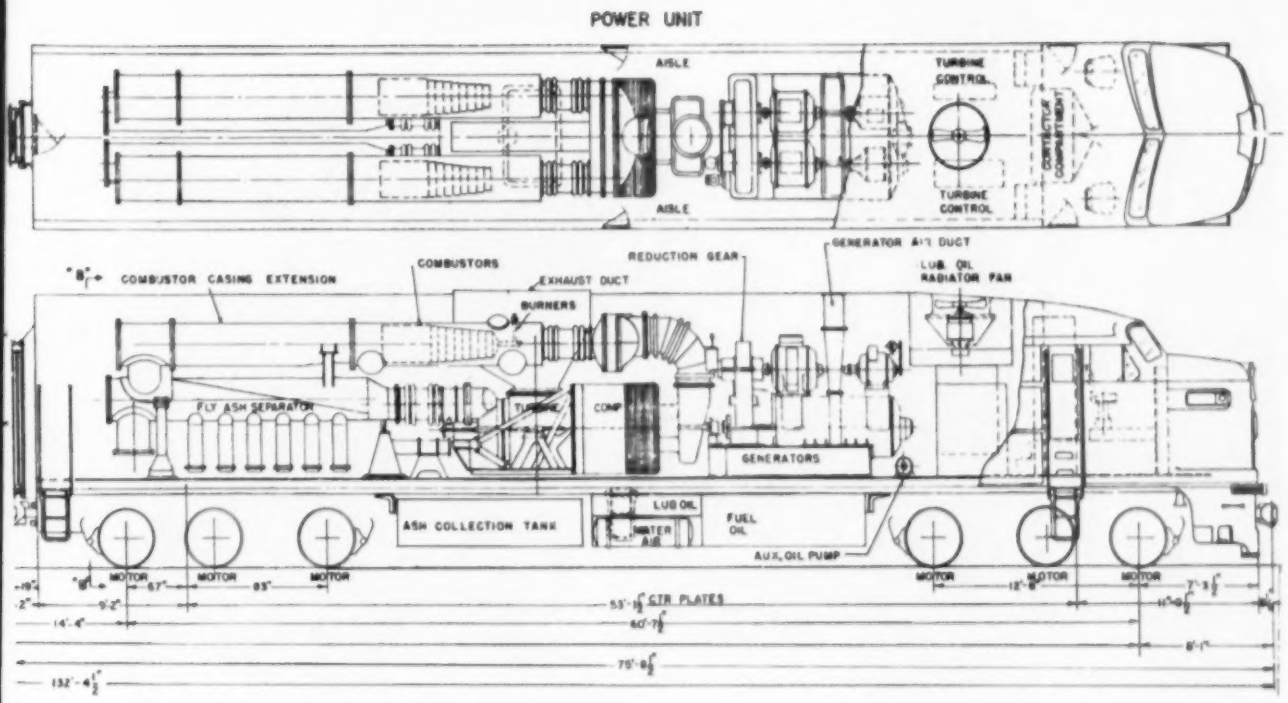
By April 19 and with 633 hours of running at 92.5 per cent load factor, it was decided to undertake cycling runs which would be more representative of actual locomotive requirements. This began on April 20 and continued for 568:34 hours. The plant was operated continuously as far as possible without shutting down between individual runs. The New York Central cycles were not intended to represent specific runs, but were typical of NYC passenger and freight operation. Both the Union Pacific and Norfolk & Western cycles were to duplicate operation over definite districts on each railroad. The Committee reported that fuel consumption during cycling operation verified their prediction that the fuel cost for a coal-burning gas turbine locomotive will be substantially less than for a diesel doing the same job.

NYC coal cost $4.20 per ton and an average NYC on-line handling charge of 69 cents per ton brought the total to $4.89. The test of 275 hours at an average load of 2,570 hp used 389 tons of ¾-in by #0-in. Pittsburgh coal, and cost $1,805. A two-unit diesel doing this same amount of work would have used about 45,000 gal of fuel oil costing $4,700 and lubricating oil costing $280—a total cost of $4,980. The saving is 63.6 per cent. If the locomotive operated at the same high load factor for an average of 4,000 hr per year, the potential savings would be $46,000.

The Union Pacific set up the loading schedule to represent their freight operation both ways between Cheyenne, Wyoming, and Ogden, Utah. During the 12 days of this test, 8,290 miles of operation were simulated, and 1,722,000 ton miles were accumulated burning Wyoming coal at the rate of 42.8 lb per thousand gross ton miles. This operation simulated handling a 2,080 ton train at an average speed of 34 mph eastbound and 37



Examples of the load cycles imposed on the Dunkirk gas turbine to reproduce typical New York Central and Union Pacific road locomotive operations.



mph westbound. A total of 370 tons of UP coal were burned during 243:32 hours of test. At an average load of 2,253 hp, a thermal efficiency of 16.1 per cent was obtained. Nearly 50 hours of operation on Norfolk & Western cycles were to represent runs in both directions between Portsmouth, Ohio, and Williamson, W. Va.

At the end of the 1955 program, and after 1,421 hours of operation, the test plant at Dunkirk was completely dismantled for examination and evaluation of wear. The concave surfaces of the rotor blades were clean although a small amount of ash adhered to their convex surfaces. There were some thin ash deposits on the stator blading. Blade erosion had been very slight and it is expected that changes in blade design can eliminate some localized conditions. The combustion and fly ash equipment was found to be in good condition. Combustors have seen over 2,750 hours of coal burning operation and are still serviceable. Control of the plant by variation of the coal pump speed has been satisfactory and substitution of wear-resistant materials should eliminate all troubles that have been encountered in the coal pump. This pump will be the throttle for the power plant. Shut downs during the operation of the plant were chargeable principally to automatic ash blow-down equipment, to the coal pump and to the instrumentation.

Original work by LDC anticipated burning any type and size of coal with any state of dryness. This has been discarded and replaced with the concept of burning coal fines (3/16-in. and down) dried at the mine, shipped in covered hoppers, and stored, conveyed and handled on the locomotive with compressed air and the aerator system. This will end any necessity for driers and complicated pulverizers on the locomotive and permits locating the fuel tank underneath. Since the amount of crushing that must be done has been so reduced, a smaller pulverizer has been designed jointly by LDC and the Riley Stoker Co.

Present LDC locomotive proposals envision a single 2,500 or 3,500 hp gas turbine on each unit, with provision for multiple unit operation if more power is desired.

	HIGH LOAD		LOCOMOTIVE LOAD CYCLES						TOTAL	
	1/15 - 4/19 5/24 - 6/9 6/30 - 7/33		NEW YORK CENTRAL		UNION PACIFIC		NORFOLK & WESTERN			
			4/20 - 5/23		6/13 - 6/28		7/29 - 7/28		1/15 - 7/28	
	HOURS RUN	TONS BURNED	HOURS RUN	TONS BURNED	HOURS RUN	TONS BURNED	HOURS RUN	TONS BURNED	HOURS RUN	TONS BURNED
POC. NO. 5	355.41	548.95	43.35	59.16					378.06	606.13
PITT. NO. 8	310.56	863.80	333.40	239.83			49.57	76.50	799.33	1370.13
UNION PACIFIC					343.32	370.00			343.32	370.00
TOTAL	893.57	1412.75	376.55	389.09	343.32	370.00	49.57	76.50	1421.11	2348.38
AVE. LOAD, HP	2200		2271		2259		2560		2894	
AVE. COAL RATE LB. PER HR	3314		3830		3095		3060		3164	
TOTAL HP HR	2,737,638		707,383		548,606		127,873		4,111,398	
LB. PER H.P. HR	1.936		1.30		1.35		1.19		1.69	
THERMAL EFF., %	18.00		18.35		16.1		17.3		18.20	
LOAD FACTOR, %	90.37		73.6		63.6		73.3		81.7	

During 1,421 hours of the 1955 coal-fired test program 4,111,398 hp-hr were produced at Dunkirk with an overall efficiency of over 18 per cent at an average load factor of 81.7 per cent.

Trackless Switcher

Big flexible tires are claimed to allow SwitchMobile to travel across tracks without damage to switches, ties or rails.

New Approach To Yard Operations

Le Tourneau-Westinghouse builds Pennsy locomotive and offers this unit for general use.

A rubber-tired switch engine which climbs across tracks, travels on city streets and can pull freight cars along the tracks like any locomotive has been named the "Switchmobile." It was built entirely to the specifications of the Pennsylvania. Now available to any locomotive user, the Switchmobile is intended to speed switching operations. Time and money could be saved because of its unique ability to travel from assignment to assignment without the need of following rails.

The Pennsylvania uses the machine in a crowded industrial area, picking up freight cars at different locations and pulling them over rails laid in paved city streets.

Because the Switchmobile runs on tires nearly as tall as a man, it can travel across tracks without damaging signal equipment, switches, ties or rails. A wheel gage of 8-ft. 4½-in. allows it to straddle rails and run on ties as well as operating on pavement flush with rail tops when pushing or pulling cars. The low air pressure—less than that carried in the tires of a passenger car—enables the machine to operate over the ties without chamfering the ends or damaging them in any way. Thus, in any rail yard the machine can take the shortest route across the yard to pick up a car for moving or switching. The Switchmobile travels with equal ease on streets, roads, or even across open fields, enabling it to take the fastest, most direct route to the shipper's platform to pick up cars and switch them to the makeup track.

A compact unit, the Switchmobile measures only 10-ft. 3-in. wide by 10-ft. 13-in. high. Its length from coupler to coupler is only slightly longer than a standard passenger automobile. In style and appearance, the machine is unquestionably "railroad." Hand rails, steps, foot boards, couplers and air hoses are all identical to those found on conventional locomotives. Even the lines of its cab carry this impression. Mounted in the center of the machine, it is high enough to stand up in, and

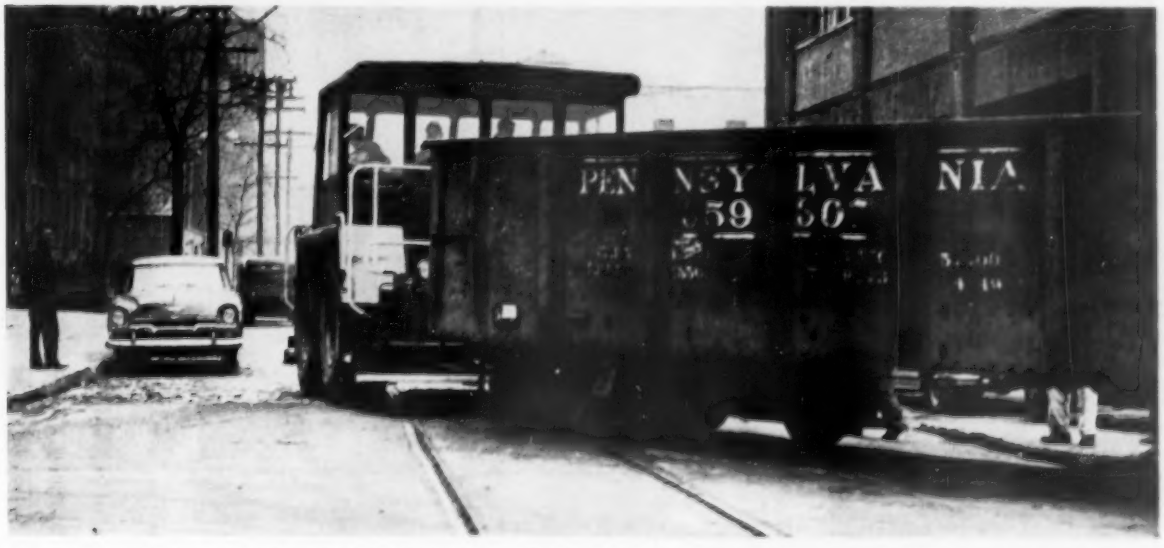
SWITCHMOBILE CHARACTERISTICS

Length, ft-in.	23—8½
Width, ft-in.	10— 3
Height, ft-in.	10—13
Wheel gage, ft-in.	8—4½
Tires	Four 18.00 by 25, 16 PR rock grip
Weight, lb	About 35,640
Tractive force, lb	30,000
Engine	GM 6-cylinder, 2-cycle, 208-hp diesel
Transmission	Le Tourneau-Westinghouse constant-mesh, four-speed transmission, offering same gear ratios in both directions
Speeds, mph (Same both for forward and reverse)	1st gear, 1.3; 2nd gear, 3.1; 3rd gear, 7.0; 4th gear, 16.0
Steering	Multiple-disc air clutches and brakes
Drive	Four-wheel
Brakes	Four-wheel, air-operated, multiple disc brakes, actuated by independent and/or automatic brake valve
Train brake equipment	LeRoi-Westinghouse compressor, two reservoirs, 10.5 cu ft capacity each. Air brake coupler hose, front and rear.
Couplers	AAR standard "E", top operating engine coupling, 6-in. by 6-in. shank with optional 11-in., 17-in., 19-in. or 21-in. knuckles.

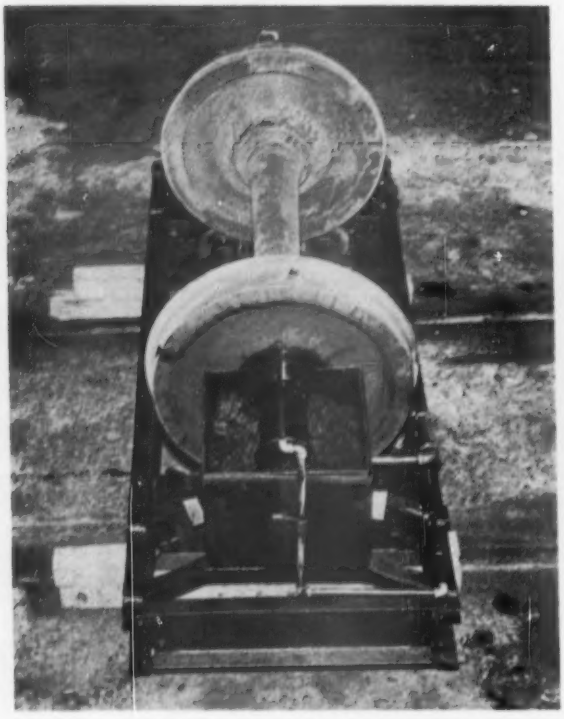
"Both ways forward" feature is accomplished by use of pivoted controls which swing laterally from a pedestal in center of cab.

standard locomotive width with large windows all the way around to give its operator full 360-deg vision without blind spots. At one end, behind a conventional hand rail, is a large open deck from which entry to the cab is made. At the other end, a compartment completely encloses the engine and air compressor.

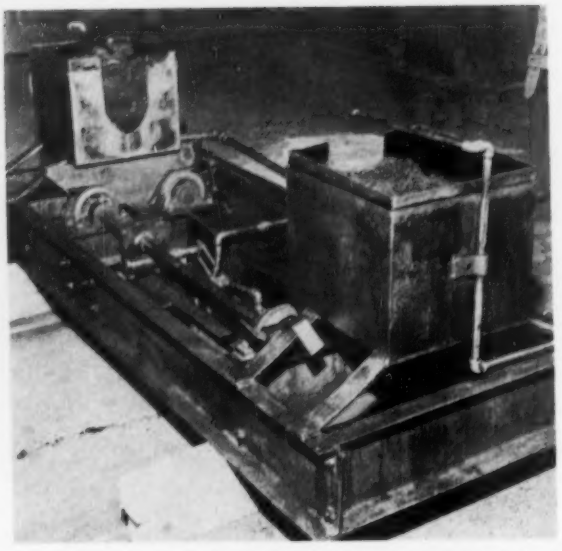
Coupling cars to the Switchmobile is standard railroad procedure, as the machine is fitted with regulation AAR Standard Type E couplers and air-brake lines both front and rear. For additional flexibility in the operations of coupling and hauling cars, the couplers are mounted on sliding tracks to allow the coupler and air hose to be centered or swung right or left as required. The wide slide action of the couplers not only allows the machine to haul cars around track curves as sharp as 50-ft. in radius, but also allows the maximum use of its maneuverability in close quarters. When working close to a fence, near power poles or along the sides of buildings, additional clearance can be gained by favoring the close side and merely sliding the coupler to line up with the car connection.



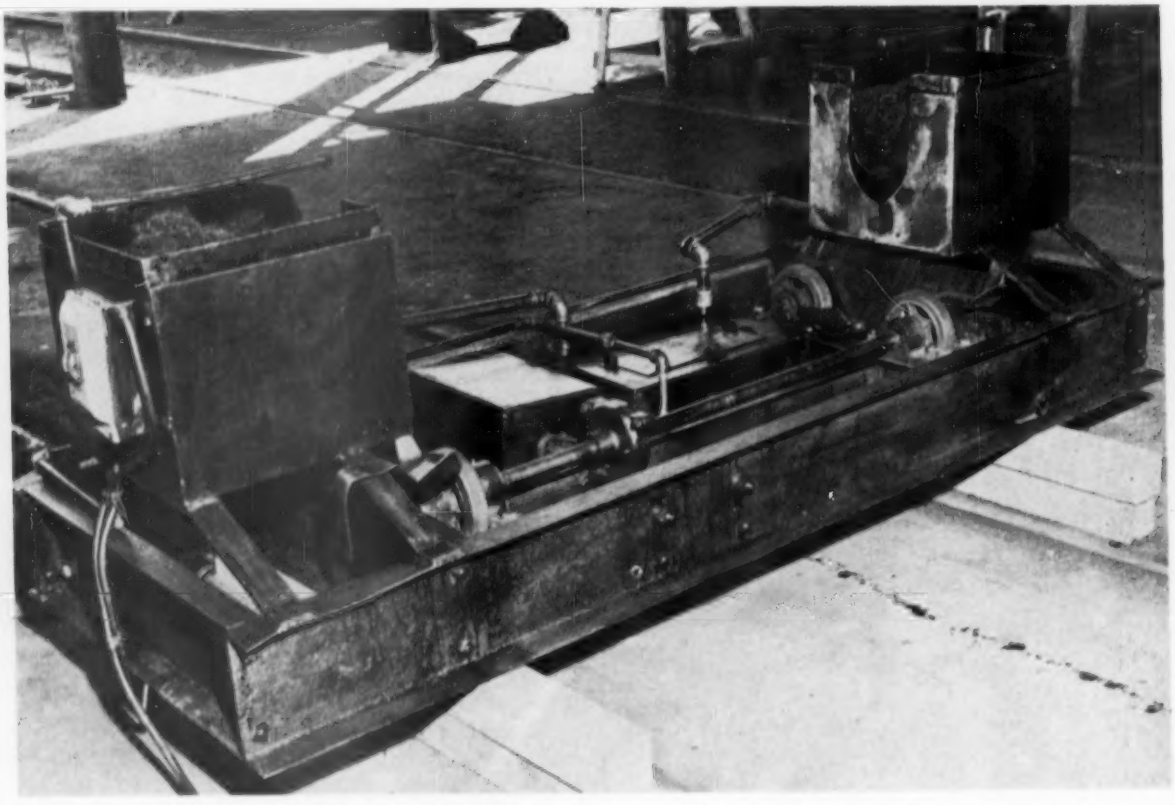
Built to the specifications of the Pennsylvania Railroad, the SwitchMobile will speed car movement in congested industrial area of Jersey City, N. J.



Journal cleaning machine takes little shop floor space. Wheels are handled in and out of the machine with the overhead shop crane.



The motor is covered with a protective shield. The motor shaft has a pump pulley and goes to speed reducer on wheel-set driving shaft.



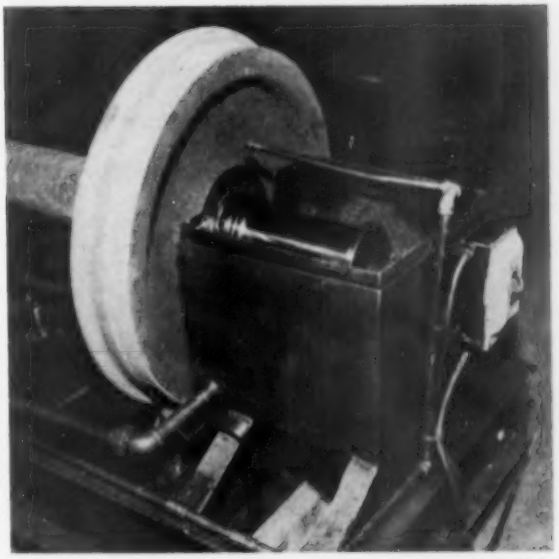
The frame is made of 12-in. channels. Spring-mounted boxes at each end contain "scrubbing" material, such as upholsterers moss or horse hair.

Cleaning Machine

Protective coating put on newly turned journals does not come off easily when it must be removed to place the wheel sets in service. This is particularly true in cold weather. The problem was solved on the Pittsburgh & Lake Erie when they built two journal cleaning machines. These units are based on a design originally made by the Denver & Rio Grande Western.

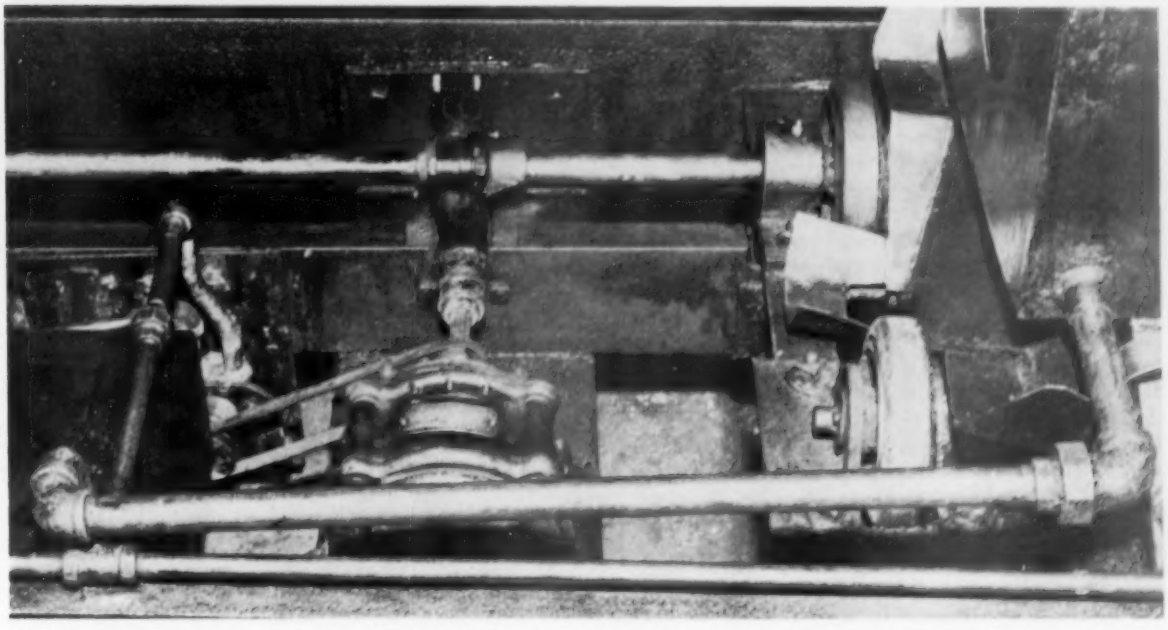
Wheel sets are loaded into the machine by the overhead shop crane. They sit on four rubber-tired rollers. Two of these rollers are idlers. The other two are mounted on a single powered shaft driven through a speed reducer by a 1½-hp electric motor. Through the driving rollers the mounted wheel set is rotated for cleaning. The journals fit into spring-loaded steel boxes at each end of the machine. These boxes are filled with upholsterers moss or horse hair. The springs allow for automatic adjustment to the various journal sizes, and provide pressure to hold the moss or hair against the journal surface. This gives the scrubbing action which removes the protective compound from the journal.

Over each journal is a ⅜-in. pipe which delivers kerosene or solvent through a series of 1/16-in. holes. Each pipe is arranged to swivel out of the way during the loading operation. Solvent is delivered from a supply tank in the base of the machine through a diesel locomotive fuel pump. The solution passes over the journal and down into the moss or hair underneath. The spring loaded box containing this material has holes in the bottom and is enclosed in a second stationary box which has an oil drain back to the oil tank.



Solvent emerges from 1/16-in. holes in the swiveling delivery pipe over each of the air-filled boxes at the ends of the machine.

The oil is filtered during its passage through the hair. It goes through the holes in the bottom of the spring-mounted box, into the stationary lower box, and back to the supply tank. From there it is picked up by the pump and used over and over. Eventually the solvent becomes heavily loaded with the protective compound and must be replaced. Moss and hair last for a long time, but must be turned over to present uncontaminated surfaces to the journals. Cleaning time averages about a minute, and does not require constant attention of an operator. Output is increased and labor costs are lowered.



Diesel fuel pump supplies solvent to the journals, and speed reducer from Evans auto loader lowers the motor output speed of 1,725 rpm.

Repaired box car at the right awaits switch engine. While this car was getting a new set of wheels, the hopper on the other track was switched in for repacking. Operations swing back and forth between these two tracks. The electric car puller in the foreground is an important tool.

Central of Georgia Speeds Car Repairs

Changes in facilities and operations at Atlanta prove that stub-track repair facilities can be as effective as the through-track arrangement in reducing car delays.

Revision of the car repair facilities and operations at the Industry yard of the Central of Georgia in Atlanta have proved that a stub-track arrangement can produce results like those obtained on the through-track facilities installed at Columbus, Ga., two years ago (*Railway Locomotives and Cars*, September, 1954, p. 54). Car delays have been greatly reduced. On the Industry rip tracks cars cannot move in at one end and go out the other. Although this might be expected to interfere with the smooth flow of work, the operation has been successful. Changes at Industry are proving that a stub-track repair facility can produce good results.

Heart of the new rip track is a monorail spanning the two car repair tracks and extending out at one end so that a considerable stock of heavy items such as yokes and couplers can be handled with the 2-ton electric hoist. On each side of the monorail installation are cross tracks which make it possible to move wheels to a car for change outs.

At the center of each repair track an air cylinder has been installed in a pit so that the wheel set can be lifted off the cross track and turned into position for installation. A narrow-gauge transfer car moves wheels from 15 wheel storage tracks. The large number of wheel storage tracks makes it possible to stock only one type of wheel on each track so that no extra work or time is consumed in getting the proper wheel set. The transfer car can be loaded by the 2-ton hoist and this system is used for emptying the wheel cars from the Central wheel shop at Macon.

The rip tracks connect with the throat of Industry yard. This is a flat yard and normally is worked only from one end. The yard locomotives can kick shop cars into the repair tracks during their regular classification work.

The two tracks allow repair work to be carried on at one track while the switch is set so that the other is available to receive shopped cars. Upon completion of the car or cars on this one track, the yard office is informed and the switch is thrown so that this track can be pulled and is then available for more bad order cars. Repairs alternate back and forth between the two tracks, with the cars on one track completed before starting those on the other. An electric car puller and snatch blocks

permit spotting cars and moving them in either direction while undergoing repairs.

The 2-ton electric hoist and two auxiliary hand-operated hoists, the area covered by the monorail, and the simplified wheel handling mean that most car repairs normally requiring several men can now be one-man operations. One man can change a coupler in only a few minutes. Even a wheel change can be done with little difficulty because the three hoists and the monorail can be used as an A frame for dismantling the car truck. It has been found that it takes less time to change a pair of wheels than to remove the journal protective compound and fill out the AAR repair billing card. Illumination permits round-the-clock operation on the tracks. Concrete pads at points along these tracks simplify jacking of cars.

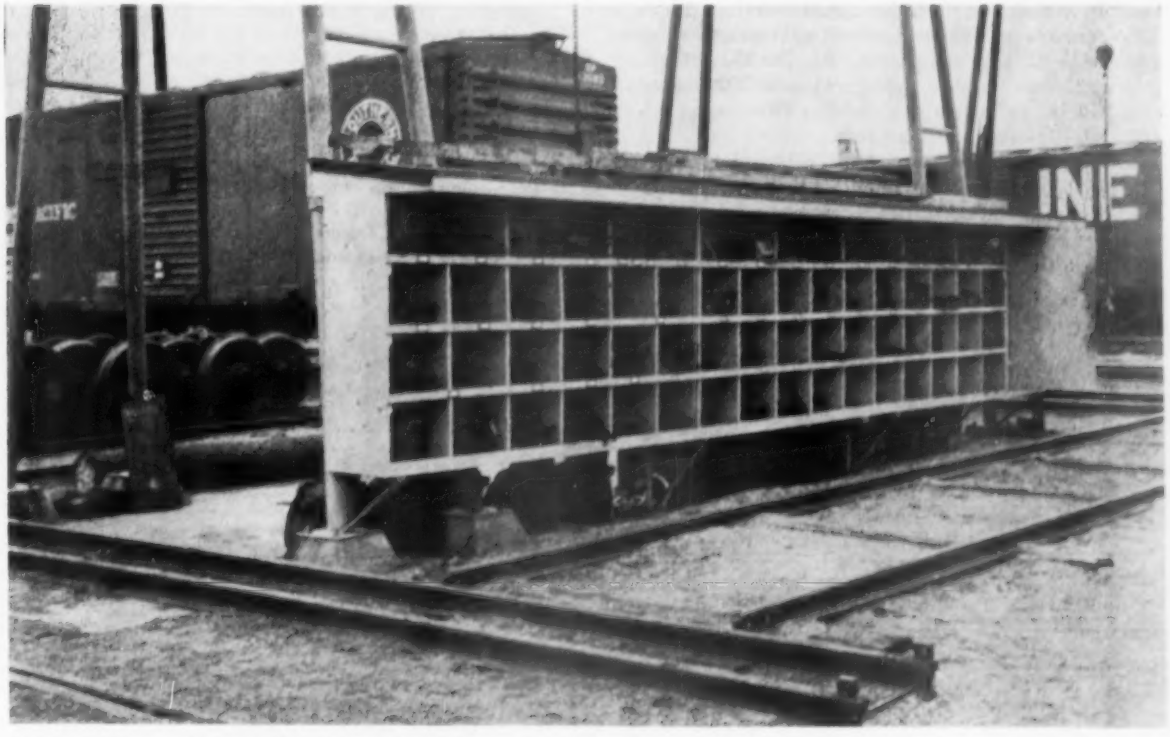
Adequate lighting and facilities which permit one-man repairs have made it possible to work the rip track around the clock.

Car department assignments and schedules have been changed so that inspection, oiling, and repairs are now done on every shift seven days per week. Formerly the car repair tracks were switched each morning with the yard locomotive separating and spotting every car.

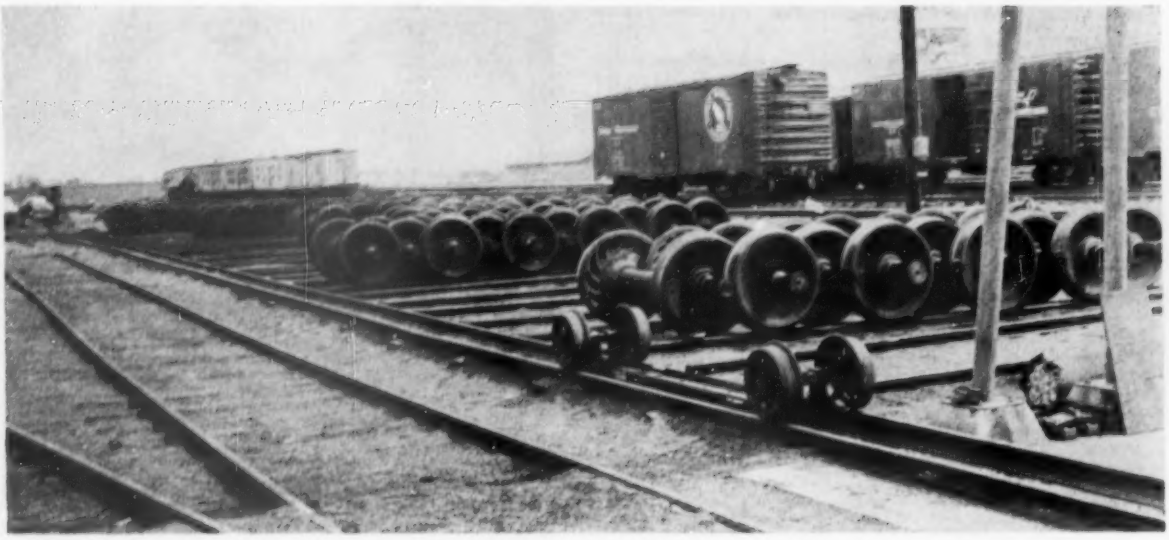
This meant that the bad order cars had to be accumulated in the yard, and it also meant that nearly every car that was shopped would spend 24 hours on the repair track, and there would be an additional delay awaiting the once-daily switching. At that time there were only inspectors and oilers on the second trick, and only inspectors on the third.

Typical repair track output is about a dozen cars

Monorail is equipped with one electric and two hand-operated hoists. Cross tracks on each side are used for moving wheel sets to and from cars undergoing repairs. Couplers, yokes and bolster are stored under the monorail and can be handled by the hoists.



Storage rack between the two repair tracks hold the multitude of pins, bolts and other small parts needed for speedy car repairs and is one more link in this successful rip track operation.



Wheel storage tracks are numerous enough that each needs hold only one size and type of wheel simplifying handling. Narrow gauge transfer car moves wheel sets to the cross tracks and installation.

daily. Repacking and brake cleaning constitute most of this work.

Loads generally are switched in for new wheels or for repair of safety appliances. The 2-ton hoist has been successfully used for adjustment of shifted loads.

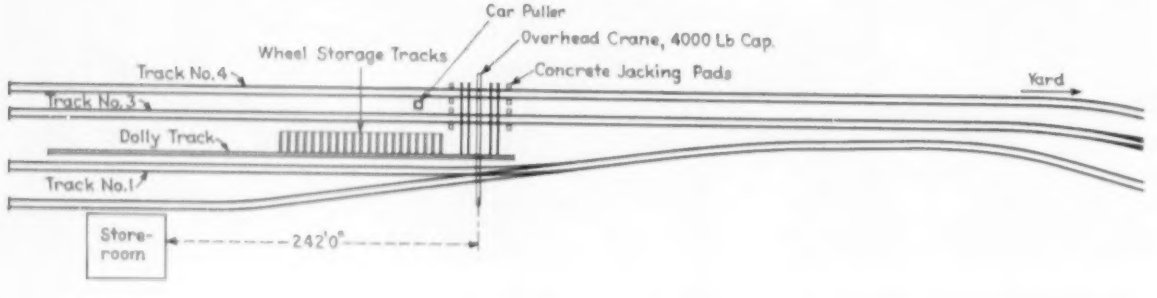
The new operation began the first of this year. There has been no increase or decrease in the number of car department employees—25 are employed. The car department with new job assignments and schedules has successfully handled an increased work load. In January, 1956, there were 251 bad order cars repaired as compared with 220 cars in January 1955. The 251 bad orders this year came from an average of over 700 individual cars handled in Industry yard daily. This was up about 50 cars daily over the 1955 figure.

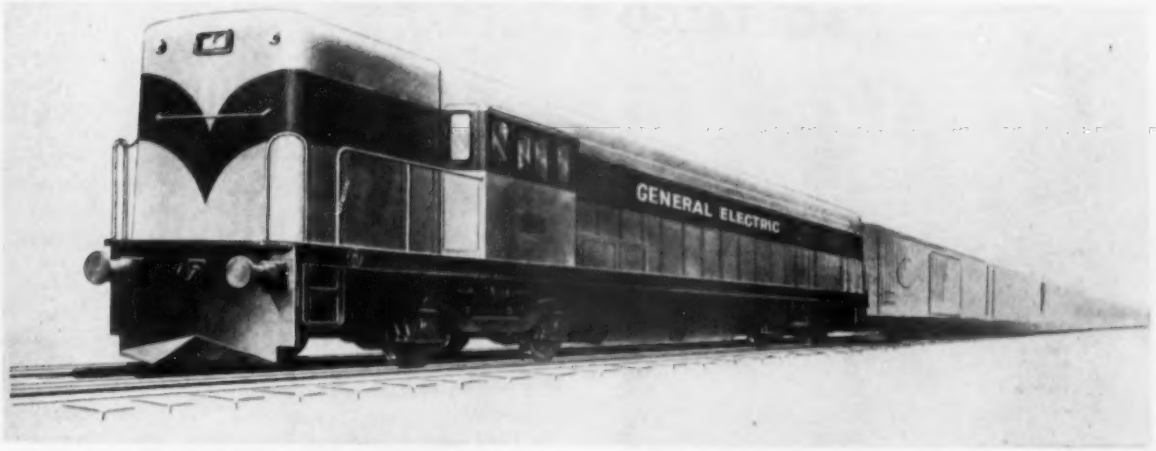
In addition, there has been a substantial reduction in car delays and the time saved is usually from 24 to 36 hours on each bad order car. The transportation department reports that requests for explanation of cars delayed in transit through Industry yard have virtually disappeared.

The changes made by the Central of Georgia have proved that a stub-track car repair operation can successfully keep pace with today's faster freight operations.

HOW MUCH HAVE CAR DELAYS DECREASED?

	Typical results from revised repair operation	Former operation would have given these results
Empty Box Car—Repacking		
Time Saved: 23 hr 15 min		
Bad order	4:30 p Monday	4.30 p Monday
On shop track	12:30 a Tuesday	7:30 a Tuesday
Released by shop track	6:30 a Tuesday	3:30 p Tuesday
Pulled	8:15 a Tuesday	7:30 a Wednesday
Hopper—Repacking		
Time Saved: 39 hr 45 min		
Bad order	3:35 a Tuesday	3:35 a Tuesday
On shop track	11:20 a Tuesday	7:30 a Wednesday
Released by shop track	1:35 p Tuesday	3:30 p Wednesday
Pulled	3:50 p Tuesday	7:30 a Thursday
Gondola—Cracked Coupler and Broken Train Line		
Time Saved: 39 hr 45 min		
Bad order	12:35 p Tuesday	12:35 p Tuesday
On shop track	1:45 p Tuesday	7:30 a Wednesday
Released by shop track	3:00 p Tuesday	3:30 p Wednesday
Pulled	3:45 p Tuesday	7:30 a Thursday





An artist's conception of a G-E universal locomotive. Available in five horsepower sizes—400, 600, 990, 1320 and 1980—the nine units in the line produce a range of maximum speeds from 60 mph to 92 mph and continuous tractive forces from 26,500 lb to 53,000 lb.

Universal Locomotives for Export

General Electric is now building nine types of motive power units which are adaptable to all overseas requirements.

A universal line of nine diesel-electric locomotives that can be used on almost any railroad in the world will be built by the General Electric Company.

There are still more than 100,000 steam locomotives in operation in countries outside the U.S. and the new line is designed to meet the current overseas motive power revolution by standardizing diesel-electric locomotives.

Any of the nine diesel-electrics can be used for switching, freight, or passenger service and can be built for a wide variety of gages. All are proportioned to meet the restricted clearances encountered abroad and can be adapted to all types of couplings and braking systems.

The nine locomotives include five horsepower sizes: 400, 600, 990, 1320, and 1930. They produce a range of maximum speeds from 60 to 90 mph and continuous tractive forces from 26,500 lb to 53,000 lb.

The 990-, 1320-, and 1980-hp locomotives can be built with two-axle trucks or, when lighter axle-loading is required because of track and roadbed conditions, with three-axle trucks. The 400- and 600-hp locomotives will both use the same chassis and the 990- and 1320-hp units will be built on the same chassis.

G-E engineers expect a floating bolster suspension system, used throughout the universal line, to reduce maintenance costs because it should lessen vibration.

This suspension system employs a truck bolster mounted on rubber pads to permit lateral motion of the truck. Fully equalized and floating on rubber, the locomotive will receive less jar and strain. Also, minimum stress will be placed on tracks and structures.

Truck maintenance cost should be reduced and maintenance procedure simplified by the elimination of the numerous complicated, and often inaccessible, support members of the conventional lateral-motion truck.

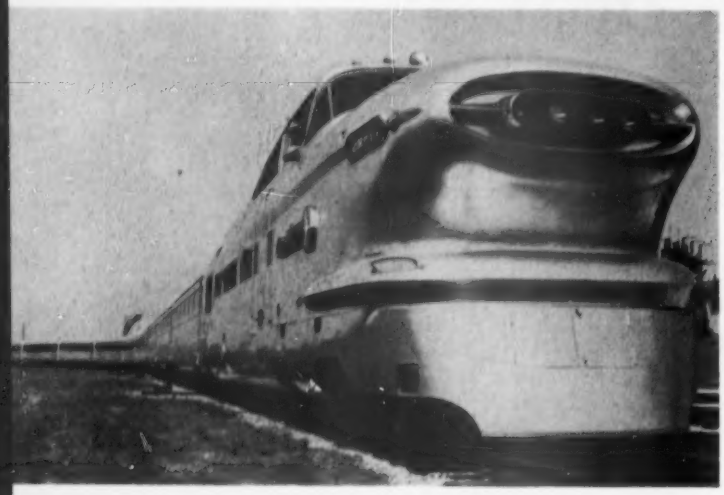
Each of the G-E universal locomotives has a coded model number which indicates its horsepower classification and the number of axles. Thus, U4B denotes a universal locomotive of 400-hp with four axles. The other model numbers are U6B, U9B, U9C, U12B, U12C, U18B, UD18B, and U18C. Other specifications of the line are shown in the chart.

OUTLINE									
MODEL	U4B*	U6B*	U9B	U9C*	U12B	U12C*	U18B	UD18B	U18C*
Diesel engine, gross horsepower	400	600	990	990	1320	1320	1980	1980	1980
Wheel arrangement	B-B	B-B	B-B	C-C	B-B	C-C	B-B	B-B	C-C
Total weight, fully loaded	104,000 lb	108,000 lb	150,000 lb	173,000 lb	157,000 lb	179,000 lb	211,000 lb	240,000 lb	206,000 lb
Weight per axle, fully loaded	26,000 lb	27,000 lb	37,500 lb	28,833 lb	39,250 lb	29,667 lb	52,750 lb	60,000 lb	34,333 lb
Locomotive speed at maximum motor rpm	60 mph	90 mph	86 mph	86 mph	86 mph	86 mph	92 mph	92 mph	86 mph
Diesel engine	D37S	D29T	FW-6	FW-6	FV-8	FV-8	FV-12	FV-12	FV-12
Traction generator	GT-595	GT-595	GT-577	GT-577	GT-581	GT-581	GT-581	GT-581	GT-581
Traction motors	GE-761	GE-761	GE-761	GE-761	GE-761	GE-761	GE-752	GE-752	GE-761
G-E specification no.	4686	4667	2076	2078	2077	2079	2080	44878	2081

*Models available for 36-inch gage applications, using GE-764 traction motors.

. . . ACF TALGO

. . . GM AEROTRAIN



. . . P-S TRAIN X

Aluminum and these Lightweights

Light metal has been used for framing, for sheathing, and for complete cars by these builders

BY G. B. HAUSER,
Head, Railroad Section
Sales Development Division, Aluminum Company of America

As all of the new high-speed lightweight trains begin operation in 1956, they will be carefully watched by all of the nation's railroads for popularity and performance. One of the chief points of interest, of course, will be construction materials, particularly aluminum.

Starting with Pullman-Standard Car Manufacturing Company's "Train X," which is virtually all aluminum, the new streamliners use varying amounts of the light metal. General Motors' Aerotrain has most of its superstructure and exterior built from aluminum alloys. Current Talgo-type trains being built by ACF Industries employ aluminum only for structural elements in the superstructure. The Pennsylvania's "Tubular Train" has only steel in its construction.

Actually, aluminum would appear to be the optimum material for building high-speed lightweight trains. It offers probably the best strength per pound of weight (strength-weight ratio) of any economical metal. In addition, aluminum offers a bright, colorful appearance and an excellent base for paint finishes.

Underframe Application

Of prime interest among railroaders will be the performance of aluminum in a passenger-car underframe. All-aluminum "Train X" should provide the answer here, using an underframe that is made almost entirely of the light metal.

"Train X" will introduce an aluminum alloy that is new to underframe construction. This corrosion-resistant high-strength aluminum alloy has been used for many years in other fields in its fully heat-treated (-T6) temper but has never been tried in railroad cars. This is Alcoa's 6061-T6 alloy. Previously, another temper of alloy 6061 had been successfully used in railroad car construction. The use of the fully heat-treated, -T6 temper, however, will permit further weight savings.

The underframe of "Train X" will be entirely fabricated from 6061-T6 alloy with the exception of the center and sills and center-sill extension which will be steel.

The use of an aluminum alloy underframe plus the reduction in wheels and axles through articulation are the key reasons that "Train X" is the lightest of the lightweight trains. It weighs only one-third as much as conventional equipment and is expected to cost only one-third the price.

According to Pullman-Standard design engineers, the use of the aluminum underframe was of prime importance in maintaining the low cost of "Train X." The nature of the articulated cars used and the new suspension system limited the amount of weight per car. If a heavier underframe had been used, the car would have been shortened with a decrease in passengers and an increase in train cost per passenger.

Superstructure

In the superstructure of the new streamliners, aluminum is probably the most widely used material. Long years of experience piled up by the Union Pacific's aluminum trains have proved the light metal's advantages in the upper part of the passenger car.

General Motors' new Aerotrain, for example, is characterized as having an aluminum superstructure which can be inexpensively replaced when remodeling is desired.

In other words, when restyling, the aluminum superstructure can be easily detached and replaced with a "new model." This is possible because of the low first-cost of the body and the high scrap value of aluminum.

Approximately 3,000 lb of aluminum alloys are used in each of the Aerotrain's 40-passenger cars. This metal is used for the outer side and roof skin (lower side skin only is stainless steel); three bulkheads; inner baggage door panels; door frames; steps, revolving platform at car entrance (aluminum treadplate); air ducts in heating and air conditioning; baggage racks; seat backs, and interior trim moldings.

In "Train X" the entire superstructure is fabricated from aluminum sheet and extrusions.

The superstructure of "Train X," while tubular in shape, is basically of conventional structural design. Side post and purlines are structural shapes formed from aluminum sheet. Some of the other members are aluminum extruded shapes.

The exterior of the two models of "Train X" now being built in Pullman-Standard shops have outer skins of aluminum, including the fully enclosed belly of the train.

Current prototypes of ACF's Talgo trains use aluminum-alloy structural components in the superstructure. The outer skin, however, is stainless steel. Most of the inside trim in the Talgo type units is also aluminum.

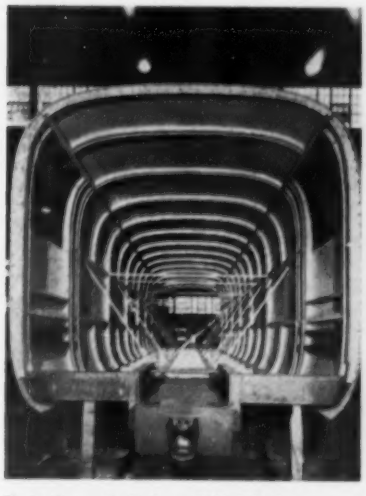
Outer Skin

One application on the new trains where aluminum will receive close scrutiny is the outer skin. Railroads have shown divided preference as to the outside finish on the trains. Some have ordered a natural metallic finish, while others seem to prefer the distinction offered by a bright painted finish.

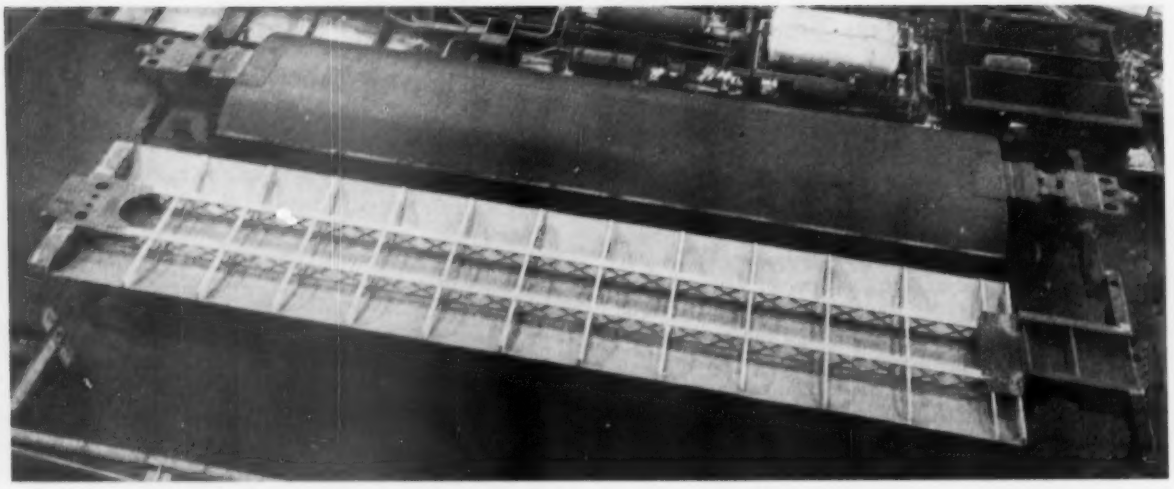
Aluminum alloy sheet will be used to achieve both of these effects and possibly add a new effect.

GM's Aerotrain uses a natural aluminum anodized, outer side panel which has been proved over long years of service on GMC buses. These extruded aluminum panels are matched with the lower panels of stainless steel which cover the baggage compartments. The aluminum roof sheet on Aerotrain is painted.

One of the two versions of "Train X" will use a natural metallic finish and the other, a bright painted surface. New York Central's version will be painted blue and citrous yellow. The other, ordered by the New Haven, will feature a two-tone exterior achieved with the same Alcoa architectural color system used in the building field. The two colors will contrast a dark gray finish with a light gray or natural aluminum. The Alcoa architectural finish will be applied to an attractive Alcoa pattern sheet.



Train X was built from 6061-T6 alloy except for the center and end sills and the center sill extensions. Superstructure is basically of conventional design. Interior of this train is lined with plastic faced materials. Weight of the car per passenger is only one-third that of standard coaches.



Train X's aluminum underframe is protected by an aluminum plate which covers the entire bottom of the car.

The ACF and Budd trains will both use unpainted stainless-steel exteriors.

Aluminum provides an ideal base for a long-wearing painted exterior. Experience has shown that paint adheres tenaciously and corrosion will not spread under the paint from a scratch.

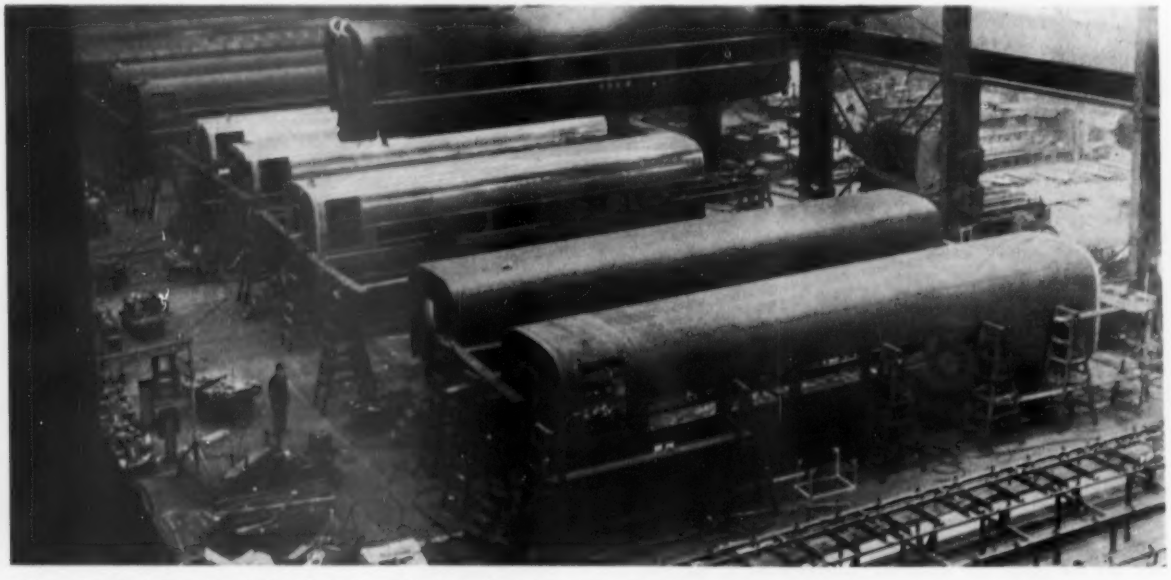
Colored Aluminum

Colored Alumilite finishes are probably the most exciting possibilities for outside finish on modern trains. Picture a solid-gold streamliner—or one with a brilliant copper color or deep metallic blue. These are some of the intriguing possibilities offered by exterior colored finishes being proved in architectural service by the Aluminum Company of America for building curtain walls and in automotive trim. In 1956 automobiles, for example, exterior trim of gold-aluminum will be used on several models. It is obvious that a streamlined train sheathed in sparkling gold is quite feasible today.

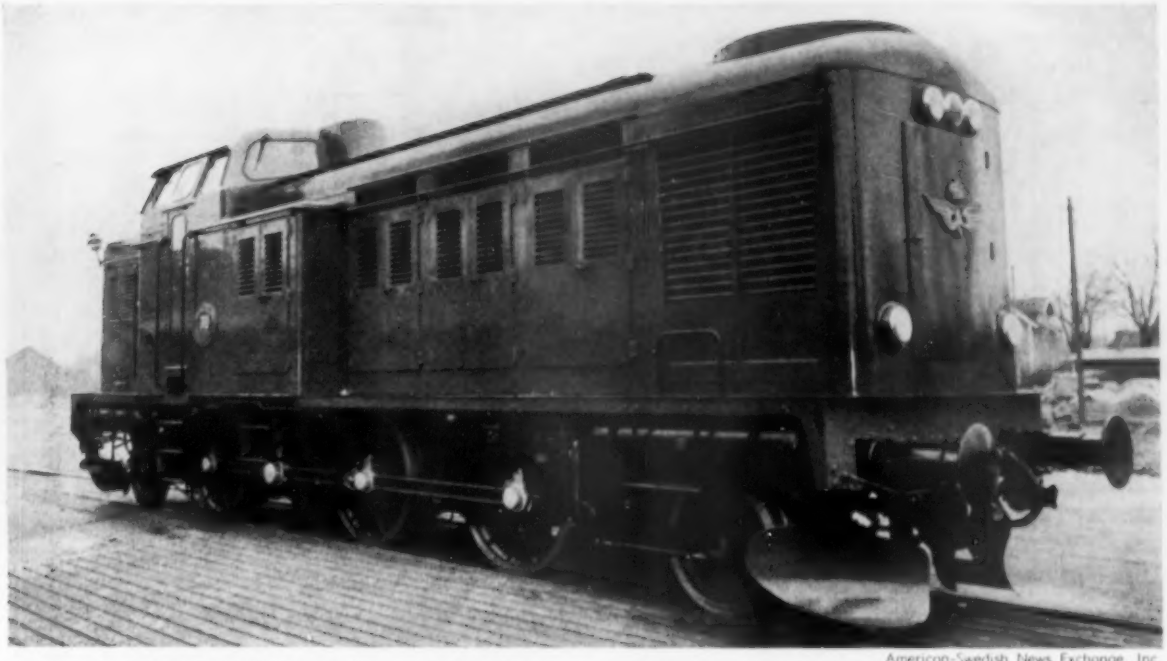
The New Haven's "Train X" will pioneer the use of a colored finish by using the dark gray finish, contrasted with natural metallic aluminum.

The surface of these color finishes is extremely abrasion resistant. The coating is a layer of crystal clear aluminum oxide, built up electrochemically as part of the metal. It is practically as hard as sapphire, which is itself an aluminum oxide composition.

It appears obvious that most of the nation's railroads are watching the performance of aluminum as a means of helping create a profit margin for passenger service. With a growing range of alloys to extend its properties, the light metal offers considerable promise. An indication of this promise is aluminum's rapidly increasing use for transportation equipment wherever operating costs of the equipment are vital.



Pullman-Standard shop view depicts Train X coaches in various stages of construction.



American-Swedish News Exchange, Inc.

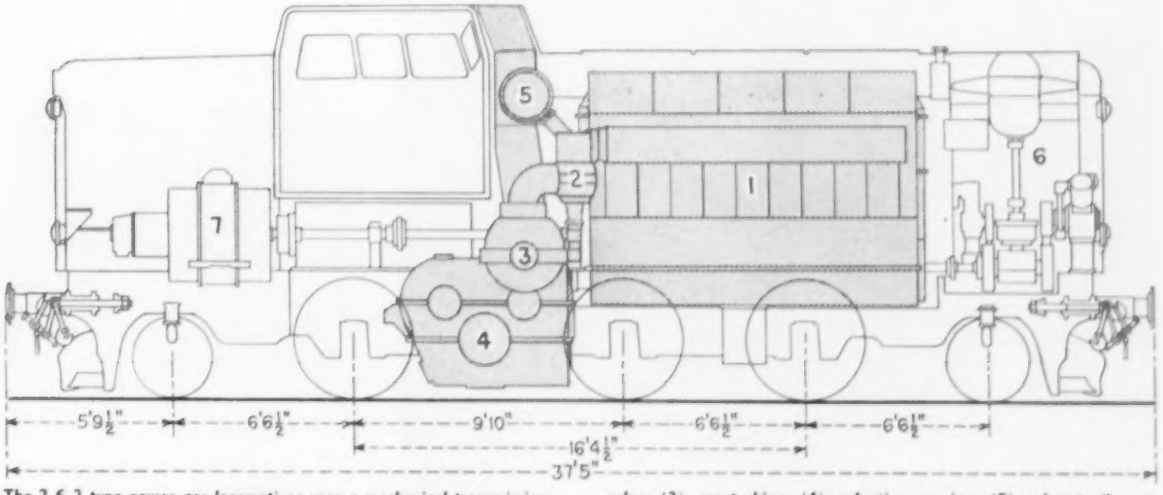
Passenger locomotive geared for 56 mph has a weight of 66 tons. Swedish State Railways expects to eliminate steam operation by extending electrification and using diesels or these power gas locomotives on lines with lighter traffic.

Gas Turbine Hauls Swedish Locals

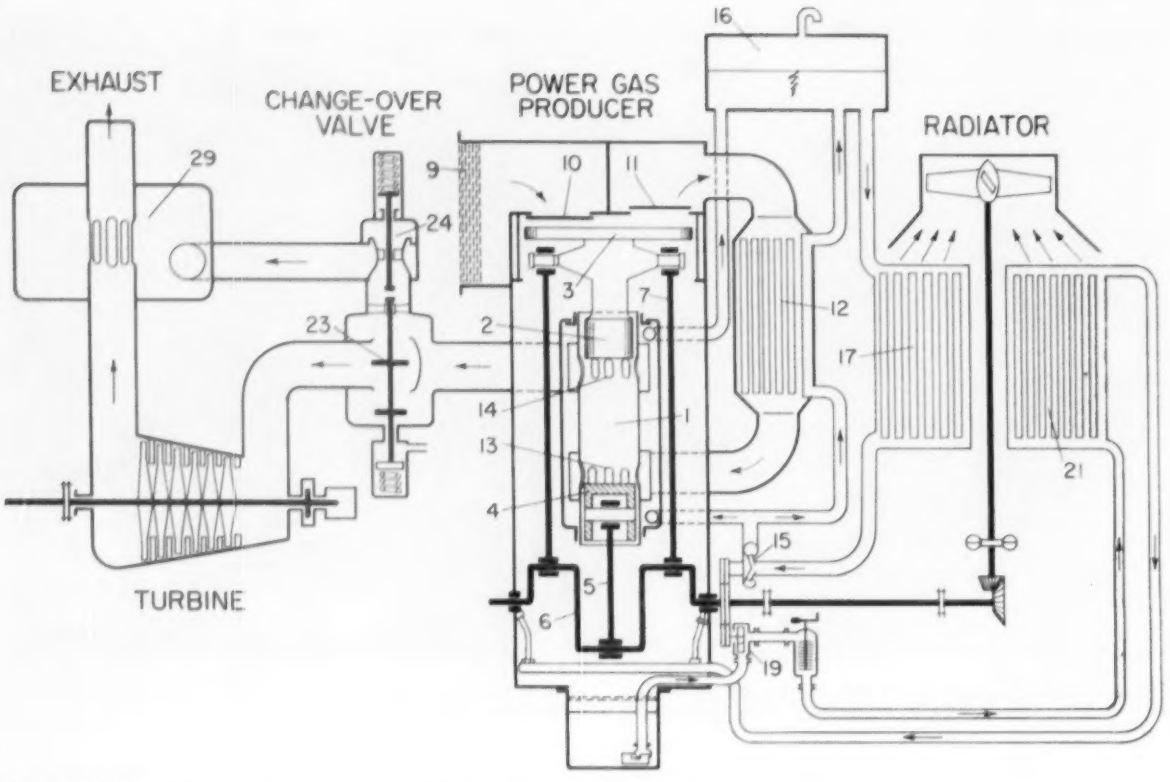
Novel power plant uses little fuel and is light in weight.

A diesel which needs no electric or hydraulic transmission and a gas turbine which idles economically have been combined to power a passenger locomotive operating on the Swedish State Railways. This 1,300 hp unit after operating for a year showed that it can achieve an overall efficiency to the rail of 31.5 per cent—a fuel consumption of 0.44 lb per rail horsepower hour. This figure is achieved when the unit is developing full power and operating at two-thirds of its maximum speed.

On this locomotive a gas producer—a two-cycle diesel—

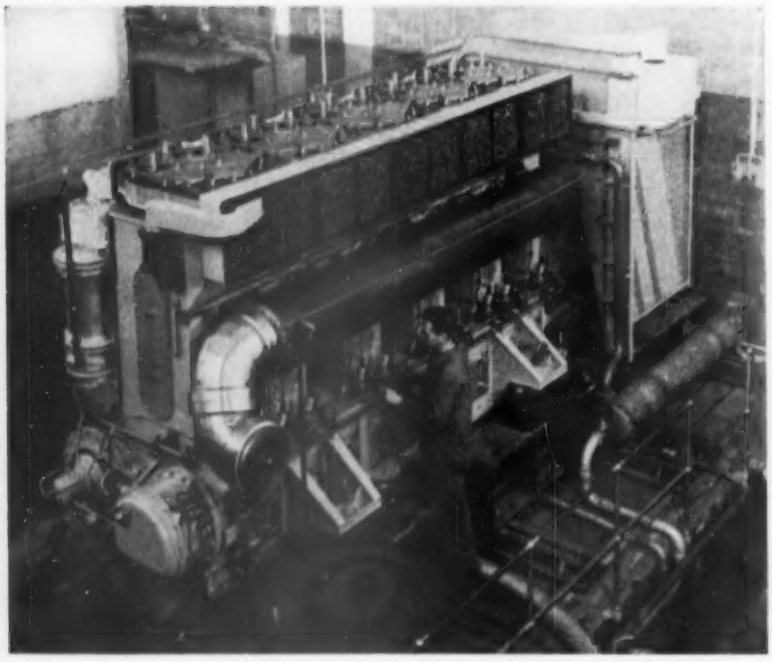


The 2-6-2 type power gas locomotives uses a mechanical transmission. Major components are (1) diesel-type gas producer, (2) change-over valve, (3) gas turbine, (4) reduction gearing, (5) exhaust silencer, (6) radiator compartment, and (7) train heating alternator.

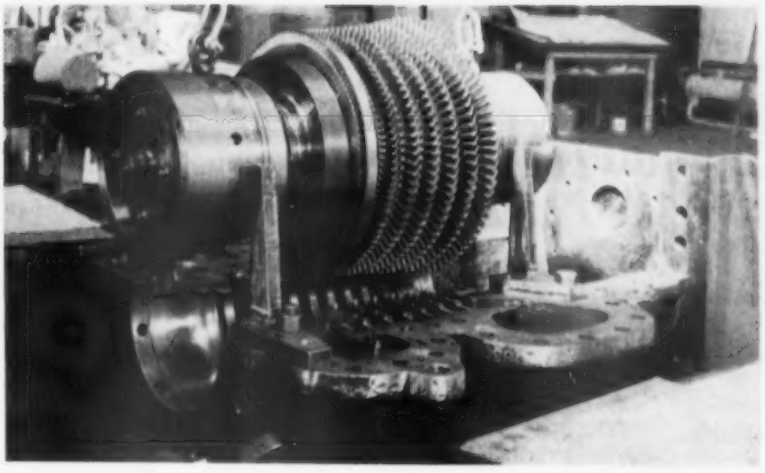


Schematic diagram shows details of gas producer and turbine. Only one of the five cylinders is shown.

1. Combustion cylinder
2. Upper working piston
3. Compressor piston
4. Lower working piston
5. Center connecting rod
6. Crank shaft
7. Side connecting rods
9. Air filter
10. Compressor suction valve
11. Compressor delivery valve
12. Scavenging air cooler
13. Scavenging air ports
14. Exhaust gas ports
15. Cooling water pump
16. Cooling water expansion tank
17. Water cooler
19. Lubricating oil pump
21. Lubricating oil cooler
23. Turbine main valve
24. Blow-off valve
29. Silencer



Power gas generator is five cylinder opposed piston diesel. Rated at 1,300 hp, the unit has combustion cylinders with 7⅞-in. diameter. Lower piston stroke is 11 7/16-in.; upper piston and scavenging piston have stroke of 7⅞-in. Full power is delivered at 720 rpm. Unit idles at 200 rpm. This is set up to 360 rpm during cold weather to operate the 125-kw train heating alternator.



Maximum operating speed of seven stage action-reaction turbine is 12,000 rpm. Overspeed operates at 14,500 rpm.

supplies the driving medium—the power gas—to a gas turbine which through clutches and reduction gears drives the locomotive. The power plant has been under development for over thirty years by AB Gotaverken, a Swedish shipbuilding firm. The locomotive was built by Aktiebolaget Motala Verkstad using the power machinery from Gotaverken. The unit is now in daily service on a 244-mile roundtrip local passenger run in southern Sweden. It has shown good availability and has regularly been able to make its scheduled time over a district where steam locomotives frequently ran late in the same service.

The power gas producer is a five-cylinder two-cycle opposed-piston diesel engine. The crankshaft has three cranks for each cylinder. The upper piston is attached to the crankshaft by two rods running up each side of the combustion cylinder, and the lower piston is connected conventionally through a wrist pin and single rod. The scavenging air compressor piston is directly attached to the upper piston and the scavenging air cylinder is placed above and in line with the working cylinder. The engine works with so high a back pressure on the exhaust gas that all the power developed except that consumed by the auxiliaries is consumed to supply scavenging air. All the air that is compressed in this reciprocating type air compressor is used for scavenging the combustion cylinders. The power gas delivered to the turbine is a mixture of exhaust gas from the combustion process and excess scavenging air swept right through the cylinders.

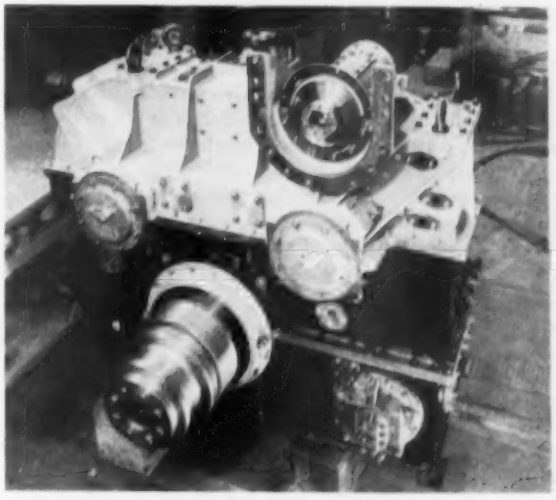
According to the builders, instead of utilizing only 30 per cent of the expansion process as is typical in diesel engines, the power gas locomotive expansion continues down to atmospheric pressure. With scavenging air pressure of 61 psi, there is about twice as much air available per unit of fuel injected as in a typical two-cycle diesel. Power gas delivered to the turbine will be about 57 psi and 935 F.

Control of power is accomplished by altering the amount of fuel injected into the cylinders. This affects both speed and power gas pressure. When the engine is idling, the gas no longer passes through the turbine. A change-over valve operates at idling speed and the gas from the diesel-type gas producer then passes off through a silencer to the atmosphere. The fuel consumption at idle is about 8 per cent of the full load consumption.

Power transmission between the seven-stage reaction turbine and the driving wheels is achieved by a double reduction gear and side rods. Gas delivered to the turbine at 935 F has a temperature of a little over 500 F when it passes into the silencer. At maximum locomotive speed of 56 mph the turbine operates at 12,500 rpm.

The power gas producer drives the radiator fan, auxiliary generator, and oil, water and air pumps. The unit is started with compressed air, and a small one-cylinder engine is available to charge the starting air receiver if its pressure has dropped. Electric train heating has been adopted as standard in Sweden. The only other shaft output from the gas producer is used to drive a 125-kw alternator which supplies this train heating power. There is a pneumatic system for changing weight distribution of the locomotive to increase driving wheel loading while starting.

The mechanical transmission has losses of only four to five per cent as compared with nearly 20 per cent in an electric transmission. The exceptional fuel economy of the locomotive is attributed to small power losses in the gearing and to the complete expansion possible with this power plant.

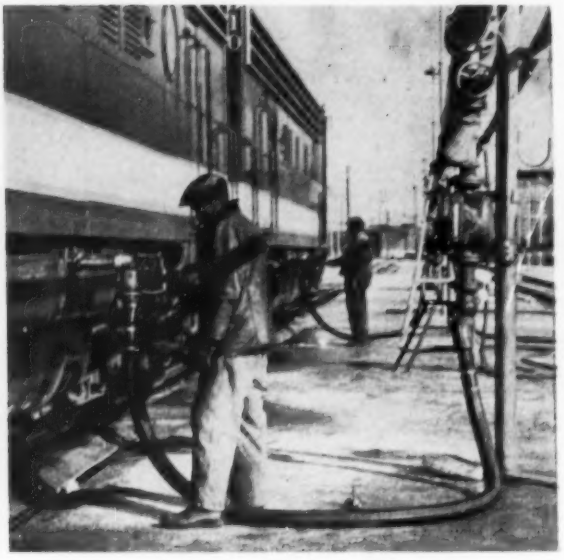


Gear transmission is double-reduction type. Hydraulic-actuated clutches control the reversing of the locomotive. Turbine speed of 12,000 rpm produces jack shaft speed of 367 rpm.

PART I

Economy Fuels

- *Who uses them*
- *What kinds*
- *Under what conditions*
- *With what results*



The following article is an attempt to analyze the present and predict the future of fuel supply, quality, price and effect on diesel operation. It is based on interviews with test engineers, mechanical engineers and mechanical operating officers from over a dozen roads throughout the country as well as oil company and other spokesmen in a position to speak with authority on one or more phases of the overall fuel situation.

The appraisal is rounded out and conclusions made broader and more meaningful by giving consideration also to test results of railroads and other companies, to reports of technical societies and to other pertinent published material.

This report combines material obtained from these sources with that gathered in the interviews. It gives individual ideas on, and experiences with, cat cracked and other economy fuels. From this aggregate data it draws conclusions on the fuel situation generally as it exists today and what it is likely to be tomorrow. —Editor.

Despite the many economies that the diesel has effected in replacing the steam locomotive, fuel still remains the biggest single item of locomotive expense. Its importance in the overall scheme of things is greater today than ever before, and this importance seems destined to continue to grow.

Percentagewise the potential savings that can be made in the railroad's fuel bill have never been greater. The steam locomotive burned a consistently cheap grade of coal. The diesel burned a consistently high grade of oil from about 1935 to 1950. Under both of these conditions there was little to accomplish in the way of fuel savings.

The lowering of diesel fuel specifications has been a gradual process over the past few years. It varies widely from road to road, as do estimates of the balance between potential savings and potential troubles. The movement has not been rapid until recently for two main reasons: (1) the railroads had some unhappy experiences 20 years ago that led to strict specifications for high grade fuel, and (2) many troubles that arise from unsatisfactory fuel cannot be detected in the early stages. By the time these troubles can be detected they are often serious and expensive to remedy.

What are some of the troubles and savings from economy fuels? Will the new cat cracked fuels appearing in ever increasing proportions make engine modification desirable? Will the wide variations between economy fuels spell the end of the standard diesel engine, at least as to timing, injector rack and other settings? How much of a problem is stability? Can economy fuels be mixed? Will they change lube oil requirements? Why do many lines feel that premium fuel is the best buy? What are the possibilities of the dual fuel engine?

To find the answers to these and other questions, Railway Locomotives and Cars conducted a wide survey among officers from railroads and associated companies whose duties and experience qualified them to speak authoritatively on one or more aspects of the general subject of fuel. The survey covers individual ideas on, and experiences with, different economy fuels. Here are those thoughts and experiences, along with some general conclusions that can be drawn from the overall survey:

1. Although tests with economy type fuels generally have shown savings, experiments have by no means been universally successful. While published material describes successful tests only, there are a surprising number of experiments where the added maintenance cost more than cancelled out the fuel saving. But nobody talks about the unsuccessful experiments where the railroad's name will be linked with the information. One road, for example, found that a $300 savings in fuel from using a mixture of No. 2 and No. 5 fuel (saving 1½ cents per gal over straight No. 2) caused maintenance cost to increase by an estimated $4100. Ring wear at a little over 13,000 miles was three times what would normally be expected after 150,000 miles. Another line had an epidemic of stuck injectors using a mixture of fairly high quality economy fuels having cetane ratings from 38 to 45 and sulphur content from 0.4 to 1½

WHAT IS CAT CRACKED FUEL?

While there is nothing approaching a precise definition of "economy fuel," more and more of it is what is termed catalytic cracked fuel.

Cat cracked fuel is not merely a lower grade of the type of fuel commonly used until a year or two ago. Rather, it is a substitute for the straight run distillate fuel which would be used if it were available in the quantities required today. Its physical characteristics may, and often do, approach those of high grade straight run distillates.

Basically, the fuel is what results when a mixture of straight distillate and residual fuel oil is put through a catalytic cracking process. This refinery process mixes the two oils and rearranges them chemically, producing a quantity of fuel suitable for diesel use which is approximately equal to the sum of the quantities of the residual and distillate oil started with. By this means the oil companies can approximately double the output of 35-40 cetane fuel from each barrel of crude, which has become necessary beause of the large demand for fuel of the distillate consistency needed for diesel engines in railroads and other industries.

per cent. A third line found that power assembly parts renewal was 8-10 times normal when using a medium quality economy fuel.

2. About the only consistent thing about economy fuels is their inconsistency in physical and operating characteristics. This can effect locomotive performance substantially. It is conceivable that the economy fuel program carried to its ultimate conclusion could cause the decline of the 100 per cent standard diesel locomotive. While the engine parts would remain standard, substantial variation in timing and other settings may be required to successfully handle different types of fuel.

3. Many roads are beginning to feel that too much attention has been paid to specifying the much higher grade oil necessary for idling and light load rather than to the minimum grade fuel on which the engine will operate satisfactorily at heavy load. Experiments under way with the dual fuel diesel (which uses premium fuel for idling and residual for heavy load operation) should settle this question within a year.

4. Lower grade fuels invariably increase filter maintenance; generally cause more deposits; and often increase wear rates of power assembly parts.

5. Most lines have not changed the timing of their engines in going to cat cracked fuels, although many adjust the racks to deliver less fuel to compensate for the increased heat content characteristic of cat cracked and most other economy fuels. One line that conducted a major study of the characteristics of cat cracked fuel and its effect on EMD engine settings achieved an aggregate fuel saving from 8—12 and improved the operation over that with the original settings and premium fuel. This was done by changing injection timing, exhaust valve closing, injector cams and power piston setting. (Complete details on what was done and the results is scheduled to appear in next month's Railway Locomotives and Cars.)

Two other lines think that it may be desirable to change the timing, while another pair find that about a third of its engines require re-timing when operated on cat cracked fuel. One of these considers a fuel's boiling range the most important single factor that determines injector timing. On most lines, the desirability of re-timing depends mainly on the percentage of cat cracked fuel in the mixture burned.

6. Lube oil requirements may have to change. Lube oil with higher additive level, or with entirely new and different additives, may offset the harmful effects of fuel degrading. This in turn could lead to a need for revising the fuel system (because such lube oil may permit the engine to burn fuels that the present supply system cannot handle).

7. Cetane number is considered of very little importance in economy fuel. Strangely enough, however, high cetane requirements are still written in most specifications for premium fuel, although most lines say that this requirement is readily waived if the price is right.

8. Catylitic cracked fuel has three characteristics mentioned by nearly every road that uses it—low stability, fouls injectors and clogs filters. This is true even of cat cracked fuels that correspond to or approach premium fuel in such characteristics as cetane number, sulphur content, viscosity and pour point. There does not seem to be much cause to expect any improvement in the quality-price relationship of cat cracked fuel. Any improvements made in it will improve its desirability for uses other than the railroad. Thus any improvement in quality seems destined to cause a comparable increase in price.

9. Geographical locations play an important role in how choosey railroads are in their fuel requirements. Those operating in cold climates tend to be conservative, using all or mostly premium fuel. Experimentation is largely confined to a few locomotives operating on short assignments. These roads feel that the risk is not worth taking to experiment with doubtful fuel on long runs in severe climate. Roads favorably located with respect to refineries, especially small refineries, tend also to stick to high quality fuels. Premium fuels are often available for little or no more than economy fuels. A good share of fuel on some lines is very high grade (50 cetane or higher) bought at distress price from refineries with storage facilities temporarily loaded. Lines that use mostly premium fuel in territories other than the above two do so mainly because they estimate the price differential to justify economy fuel to be 1½ to 2 cents a gallon (or about twice the normal differential).

10. Agreement is not unanimous that there will be a long term gain for the railroads in exploring economy fuel. Dissenters feel that products of the oil industry are priced strictly according to the law of supply and demand; and that cost cannot very well be segregated or be an important factor in determining the price of different products of crude. They feel that an increase in demand by the railroads for economy grade fuels will raise their prices very close to that of premium fuel. Others feel that the railroads have no choice—that price differentials will dictate that they use lower and lower grades of fuel and that they will simply have to find ways to live with it. Furthermore, in the event of war or other national emergency, experience gained beforehand with economy fuels will be invalu-

able. Time will tell which group was right. Meanwhile, here are some of the present experiences with economy fuel.

One of the more interesting aspects of the fuel situation is that no two lines—at least among those interviewed—seem to have at all similar sets of problems. Many have one or two problems or difficulties in common with one or more other roads but no two total combinations were very much alike. Perhaps the closest agreement was on the most important single characteristic of fuel. Nearly every one agreed that with economy fuels stability was the most critical characteristic. Two lines felt, however, that the service in which the diesel was to be used was of greater importance. In fact one of these two lines plus two others reported no problem whatever with stability in storage.

Limits on Mixing Economy Fuels

A variety of opinions exist on whether economy fuels can be mixed. Some people feel that even those types of low grade fuel that are stable individually may give trouble if mixed. One group of roads follows the practice of buying economy fuel in quantities that will be used within a few weeks. This group buys premium fuel where long storage will be necessary—quite often stocking up on batches that can be had at bargain prices.

One line that uses several types and grades of economy fuel keeps the fuels segregated in storage but does not hesitate to mix different ones on the locomotive (as fuel is taken at different points along the line). The feeling is that the constant vibration of the locomotive keeps the different fuels thoroughly mixed and that the relatively short time the fuels are together from delivery to burning will not cause any serious difficulties.

Interestingly enough a couple of other lines think that the principal difficulties occur with economy fuels after they are on the locomotive, although mixing of different grades does not seem to enter into this situation. The trouble here occurs on passenger locomotives where the fuel tank is wrapped around the water tank. The latter is kept warm by the steam generator discharge, and it in turn keeps the fuel warm which accelerates its decomposition.

This problem occurred on two lines. One uses a mixture of even parts of cat cracked and straight run fuel. The second uses a mixture of the same two types of fuel but the proportions vary as all one type of fuel is supplied at one location while all of the other type is supplied at other locations. The principal problem that arose was lacquering up the injector plungers which apparently resulted when the engine was shut down and deposits from the hot fuel solidified.

A directly opposite thought on the ultimate result of warming up the fuel occurred on a road which uses premium fuel for over 95 per cent of its requirement but is experimenting both with residual fuel in a dual fuel diesel and a degraded fuel in a conventional diesel. The latter is confined to one group of 10 units. It has been used 14 months, going through two winters, without engine difficulties. The only change on the unit using the degraded fuel is the addition of a small heat exchanger in which the heat is supplied from the lube oil.

The heat exchanger has been found helpful in preventing stuck injectors. While the heating may reduce stability somewhat, the reduction is not enough to cause difficulty in the relatively short time the fuel is aboard the locomotive before it is consumed. The principal problem with this degraded fuel, which is a mixture of cat cracked and straight run, is that it is not compatible with any other fuel used by the railroad, including premium. Stability is not a problem—addition of a dispersant permits it to be stored without difficulty.

Testing Stability and Compatibility

A commonly expressed need is for an accelerated test to determine storage stability of cat cracked and other economy fuels to predict in advance how a given supply will behave. One study indicates that storage from 12-13 weeks at 110 deg F causes the same deterioration of fuel as a year of normal storage, but this is not considered sufficiently accelerated.

Currently, stability is being checked two ways, neither of which predicts the condition of the oil at a future time.

The first takes a sample of oil from the storage tank at intervals and examines it. The second is to set aside in the laboratory a sample of oil from each batch delivered and watch it for tendency to settle out. Several lines are experimenting with accelerated tests. A typical such test is to heat the sample to 220 deg for a 24-hour period in the presence of copper to accelerate the formation of gum and sludge. This bears some relation to storage stability but a direct correlation has not been determined. Another test is to heat the fuel to 250 deg for one hour and to measure the amount of darkening by photo-electric measures.

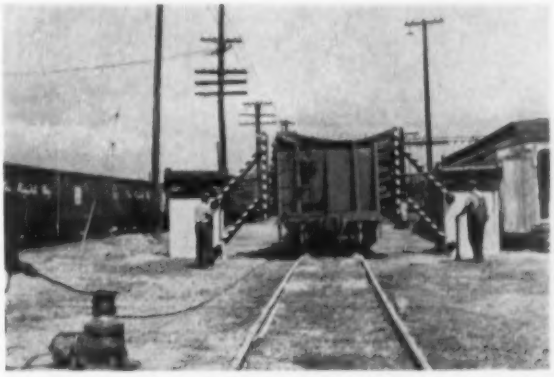
To measure compatibility another line has selected 12 economy fuels which run the expected range of characteristics to determine which economy fuels can be mixed together and still remain stable.

A little different twist is given to the storage and compatibility problem by a line which has abandoned completely all fuel specifications (judging each batch on its own merits and buying on the relationship of overall quality to asking price). This road's concern in storing different batches of economy fuel is not whether they are compatible—but whether they will mix—or whether the top layer of oil in the storage tank might remain on top of future batches and not find its way into diesel locomotive tanks for a couple of years, thus making stability the critical factor. Because of this possibility, fuel is being put in the top of some tanks.

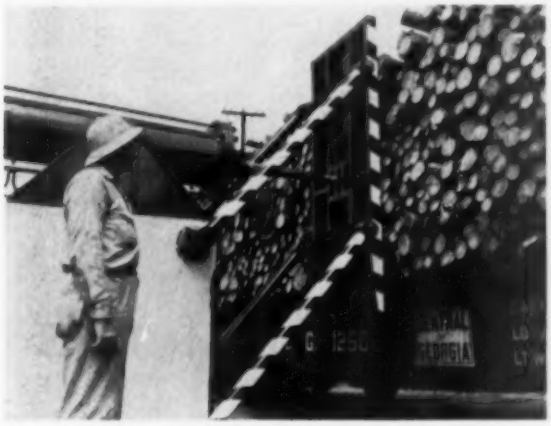
In contrast to the opinion of the vast majority of lines, one road finds that the only noticeable effect from a year's usage of economy fuels is an increase in the need for cleaning and charging fuel filters. There has been neither storage problems nor adverse effect on engine parts life. Different oil companies furnish the fuel, some of which is straight cracked fuel, the rest a blend of cracked and straight run. All types are mixed indiscriminately in storage tanks with no difficulties so far. These contradictions in experiences with economy fuels serve to emphasize the wide variations between the different fuels currently being used—not differences in the methods of testing or evaluating the different fuels.

(To be concluded next month)

Ideas for the Car Repair Man...



Pulpwood adjusting installation is on the car repair track at Columbus. Car puller moves one or more cars through the adjuster while two operators control the two cylinders individually.

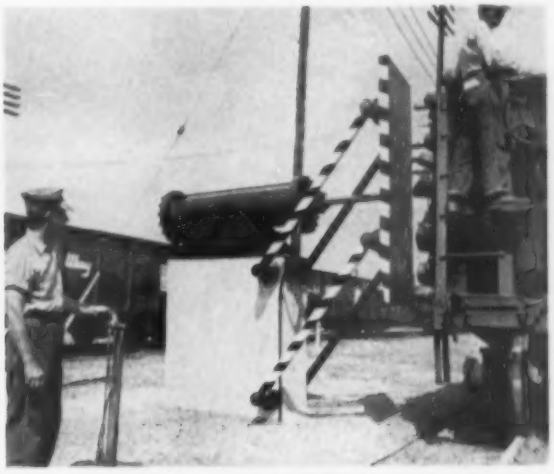


Cylinder is double acting and control valve can admit air to either side of the piston as desired. The ram operates at the same speed when traveling in either direction.

CG SIMPLIFIES PULPWOOD LOAD ADJUSTMENT

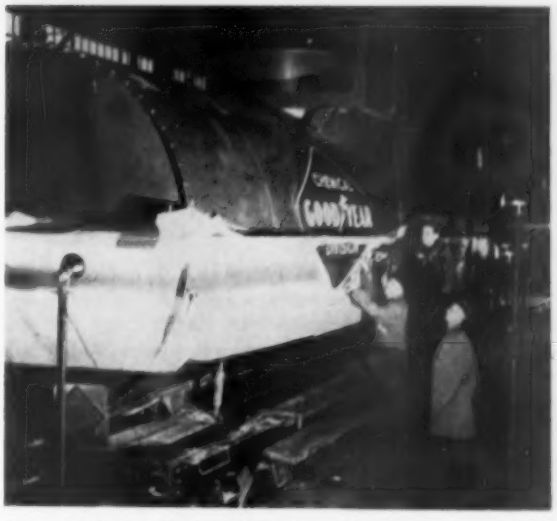
—The problem of adjusting improperly loaded pulpwood cars on the Central of Georgia at Columbus, Ga., has been greatly simplified and speeded by using an air-operated adjuster. At the suggestion of G. W. Burke, master mechanic at Columbus, the equipment was designed, built and installed on one of the car repair tracks. Formerly incoming pulpwood found extending beyond clearance limits was adjusted by the agent's forces. Typical cost of this operation was about $25.

The device is in reality a gigantic "C" clamp. The pedestals on which the two cylinders are mounted are the ends of a large reinforced concrete structure running under the track. Even though the two cylinders are mounted on the common base, they need not be operated at the same time and are individually controlled. With an air pressure of 100 psi, each cylinder exerts a force of 18,000 lb. This has proved successful in aligning all the loads which have been received.



Pantograph arrangement removes bending forces from the piston rod and has proved to be an effective guide for the reinforced plate which actually moves the logs on the car.

Cars placed on the rip track for load adjustment are moved between the two cylinders with an electric car puller. Each cylinder is individually operated. The pantograph arrangement for guiding the pusher plates is important since this removes bending loads from the piston rods. The equipment was designed by W. H. Leavengood, mechanical engineer. A duplicate installation will be made at Macon, Ga., soon.



To speed drying of paint in cold weather so that cars can be stencilled, Union Tank Car's Wood River, Ill., plant uses portable infra-red lamps directed at areas where lettering is to be located. Remainder of car is allowed to dry at the regular rate.

New battery shop at Colonie, N.Y., has resulted in substantial savings for the Delaware and Hudson.

Two-Man Shop Serves All Batteries

Carefully-planned D&H facilities at Colonie, N. Y. are expected to extend battery life as much as two years

By S. K. Lessey

Service Manager Exide Industrial Division
The Electric Storage Battery Company

A new battery shop at Colonie, N. Y., already has resulted in substantial savings for The Delaware and Hudson, bridge line between New England and Canada.

Occupying a section of a large new diesel facility still under construction, the carefully planned and well equipped shop soon will have paid for itself through better battery performance and actual cash savings.

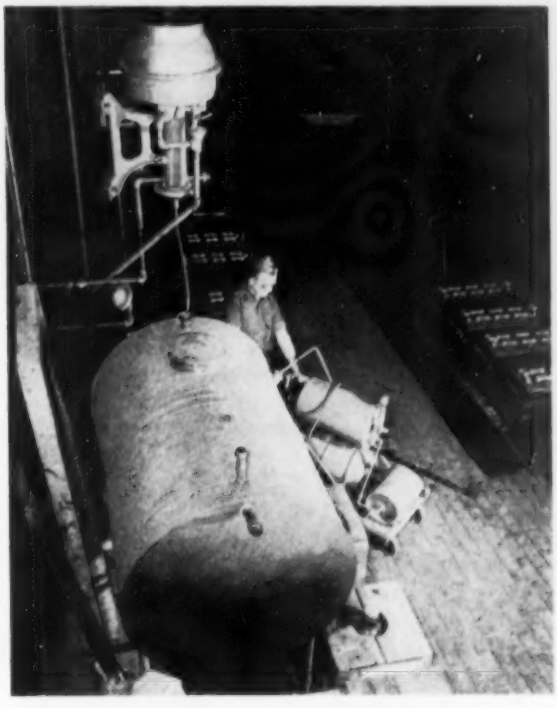
Life of lead batteries will be extended as much as two years, according to Samuel E. Walsh, electrical foreman in charge of the shop.

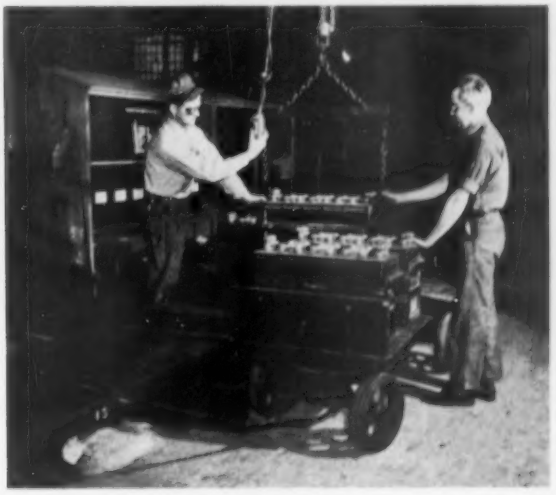
The shop, which is capable of servicing all batteries used in diesel starting, car lighting and air conditioning, signaling, electric industrial truck and miscellaneous services on the D & H, also will improve battery performance.

The shop is laid out and planned so that operations can be performed in minimum time. Any battery service job can be handled in the new shop in 30 to 40 per cent of the time required in the road's old, much smaller shop, which is now abandoned. The entire battery shop operation for diesel locomotives, passenger train cars, and the preponderance of the railroad's signaling system and electric industrial trucks is performed under the supervision of an electrical foreman by only two men—an electrician and a helper—eight hours a day, five days a week.

Commissioned January 3, 1955, the shop was needed because of expanding use of diesel locomotives and the resulting increase in the number of batteries. Service engineers of Exide Industrial Division of The Electric Storage Battery Company worked closely with D & H in executing the plan of the shop.

The switchboard and control panel in the background was specially designed for the D & H battery shop. Shown also are one of two motor generator sets and a portable voltmeter table. Note sub-floor conduit under battery racks at right in which all cables are laid. Note also on wall at right ventilating duct and windows which may be swung open.





The electric overhead crane is used to remove batteries from the storage rack to a hand truck. The battery racks are the same height as truck. The receptacle under the rack at the left foreground is used for charging batteries.

The still shown here supplies water to the large storage tank and the portable flushing wagon is filled from the tank.

The sketch of the shop shows how it is arranged for smooth, orderly processing of batteries. Spaciousness, cleanliness and neatness are impressive. Storage space (see Nos. 6, 29, and 30 on sketch) is adequate. Every commonly used tool has its place on a rack (18). Equipment has been designed and located so that batteries move quickly and easily through cleaning and inspection, equalizing charge, specific gravity adjustment, discharge, recharge, repair and final cleaning processes.

Vital to moving the batteries within the shop and pulling cells for repair is the overhead electric crane which covers the entire shop (10). Hand trucks (21), the same height as the battery racks (7), also are used for moving the batteries within the shop and for receiving and shipping. Neatness and ease of movement are enhanced by sub-floor conduits (4) in which all cables are laid. Connections to batteries and equipment are made from plugs installed in the battery racks.

An unusual feature of the 18-foot switchboard and control panel (1) is a jumper plug system which simplifies circuit changes. By pulling a plug at the rack, batteries also can be disconnected without going to the panel. Specially designed by the Delaware & Hudson in cooperation with the General Electric Company, the panel has individual controls for each charging location. Thus, for example, some sets of batteries can be charged at 40 amp and another set at 20 amp without interference. Power is obtained from two stationary motor generator sets (2 and 3), rated at 500 amp 90 volts and 300 amp at 55 volts.

Portable discharge testers mounted on casters (8) enable all checks to be made at one time. The testers, also designed by D & H and GE, have wire-wound resistors controlled by switches and a rheostat. They include both voltmeters and ammeters. The equipment is designed to discharge 32- and 64-volt batteries at 30 to 100-amp rates.

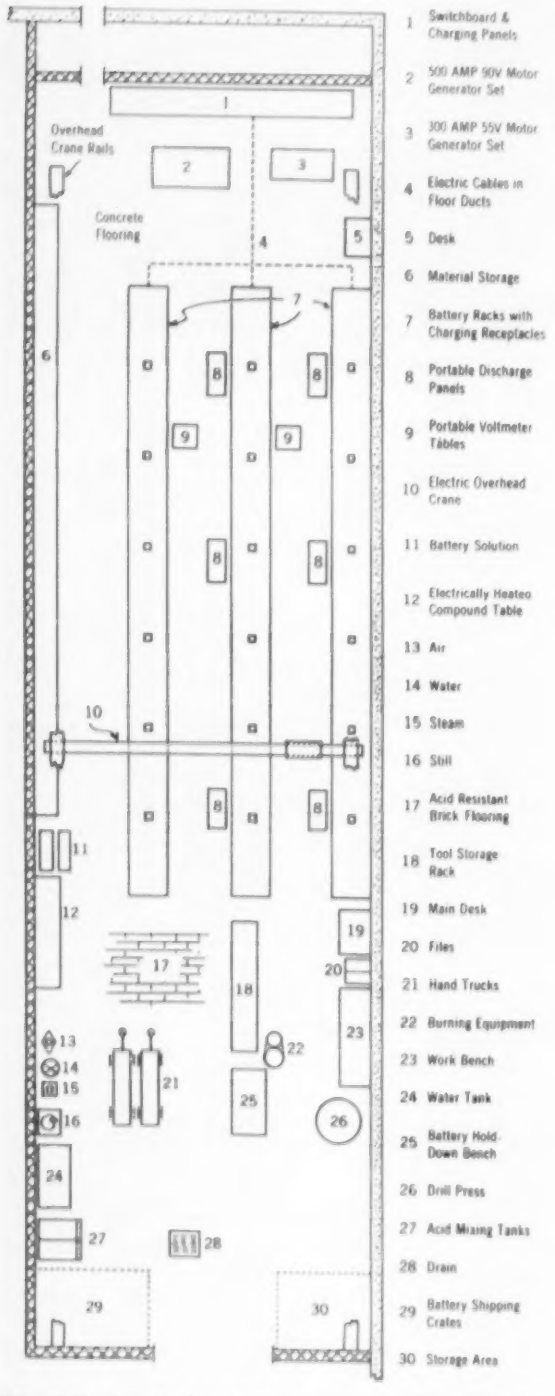
Portable voltmeter tables (9) make for ease in taking readings.

Water and acid are mixed by compressed air in two lead-lined wooden acid tanks (27) designed in cooperation with the Exide Industrial Division.

An example of planned time saving is the handling of sealing compound for battery containers. The compound is melted on an electrically heated table (12) in the same 5-lb cans in which it is purchased from Exide. A special handle is used to lift the cans from the table for pouring into an electrically heated ladle. The compound cans are discarded, and thus there is no need for pot cleaning. Storage of the compound in the original containers until ready for use minimizes deterioration caused by overage.

Used intercell connectors are salvaged and reconditioned on a buffing wheel and drill press reamer (26). Lead burning, the process for attaching the connectors to the batteries, is done with oxyacetylene equipment (22).

The shop which is 142 ft 6 in. long by 29 ft 2½ in. wide, has fluorescent lighting, with windows on one side. Wire mesh screening separates it from the rest of the diesel facilities. Exhaust fans and ducts provide good ventilation. Flooring of the work area (approximately 47 ft x 30 ft) is of acid resistant brick, a feature which will eliminate expensive floor replacement. The remainder of the floor is concrete.



Plan of the shop showing location of equipment. The new battery shop arrangement provides for smooth, orderly processing.

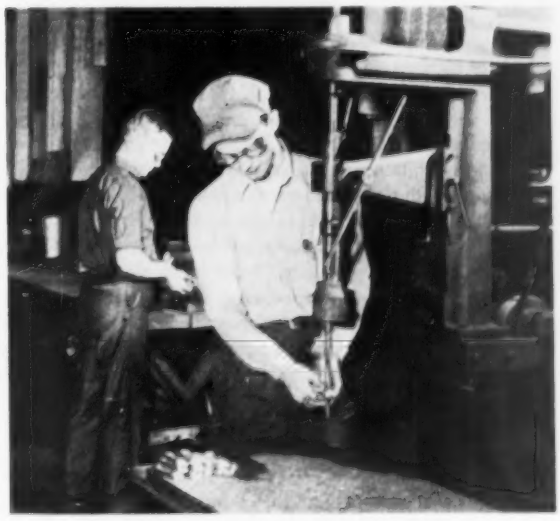
TOOLS AND MATERIALS USED

1 cell filler
6 hydrometer syringes, spare floats and barrels
6 battery thermometers
3 sealing compound thermometers
2 separator inserters
2 seal nut wrenches
2 connector pullers
2 element pullers
2 putty knives
Assorted screw drivers
2 post builders
1 portable electric drill
1 side cutting pliers
1 end cutting pliers
1 wire cable cutter
4 small steel wire brushes
2 center punches
1 lead burning outfit, including oxygen and acetylene or hydrogen gas tanks, torches and tips, and rubber hose
Bar lead
1 electrical compound pouring ladle
2 8-oz filling syringes
1 triangular scraper
2 rubber electrolyte buckets
Sealing compound
CSE caulking cord
Red paint
Black paint
Cleaning rags
Dark glasses for lead burning
Rubber gloves

Intercell connectors are burned to the battery terminals with an oxyacetylene torch. The rack in the background provides a place for all commonly used tools.

A cell of Exide-Ironclad battery is pulled with the electric overhead crane. Note the tongue-like lifting unit and battery hold-down device.

The D & H battery maintenance program extends beyond the new battery shop. Every thirty days locomotive department electricians test gravity, add water and inspect connections of diesel starting batteries, check regulator settings and adjust if necessary. Voltage and gravity of car lighting and air conditioning batteries are tested weekly, oftener when necessary. Regulators are adjusted regularly and given an annual overhaul. Diesel and car lighting and air conditioning batteries are removed and put through the shop every two years. Batteries in dining car service, because of rugged use, are shopped annually.



The electrician seated at the portable voltmeter table records voltage readings while his helper applies the voltmeter prods to the cell terminals. The panel behind the men is mounted on a portable discharge tester.

Used intercell connectors are salvaged and reconditioned by means of a buffing wheel and drill press reamer.

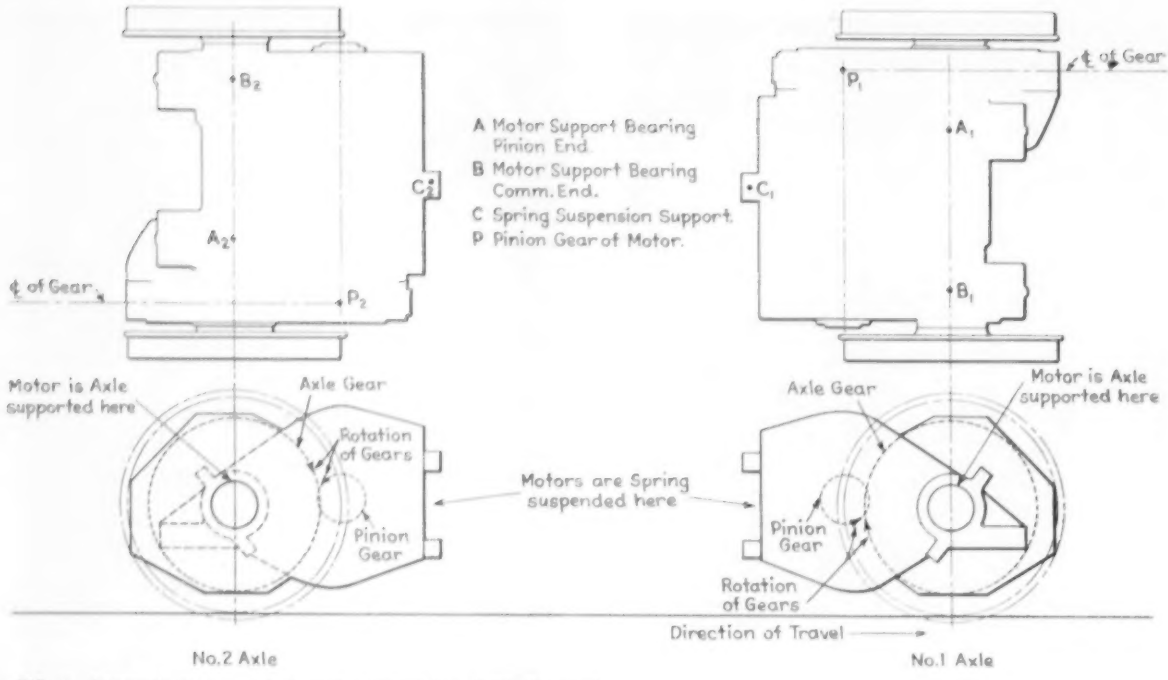


FIG. 1: Schematic arrangement of traction motors in a locomotive truck.

Why Motor Support Bearings Wear Unevenly

BEFORE APPLYING POWER to a traction motor, the static weight of the motor is supported by the motor support bearings (A and B) and the spring suspension (C), Fig. 1. This makes a three point suspension.

First, consider the motor at the No. 1 axle in Fig. 1. When the power is applied to the motor, the pinion gear (P_1), which is meshed with the axle gear, rotates counterclockwise in order to move the truck to the right. The reaction of the axle gear against the efforts of the pinion gear (P_1), creates a downward force on the motor at the pinion gear (P_1). Because the gear is not at the center of the motor, it tends to tip the motor using the pinion end motor support bearing (A_1) and the spring suspension (C_1), as fulcrums. This will cause the motor to lift at the commutator-end motor support bearing (B_1). The result is a load on the top half of the pinion end motor support bearing (A_1) and at the same time a load on the bottom half of the commutator motor bearing (B_1).

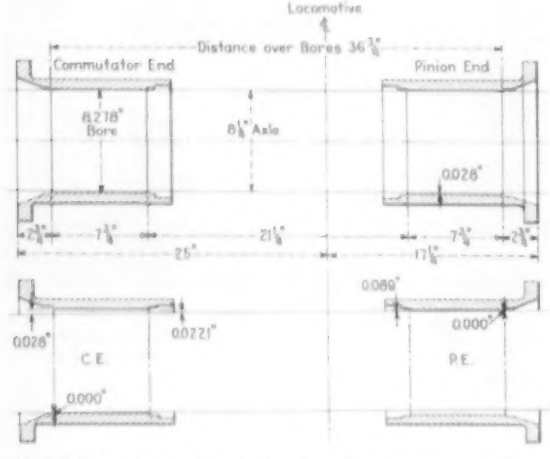


FIG. 2: The static position of the axle is shown above and the working position below.

Now let's consider the motor at the No. 2 axle. When the power is applied to this motor, the pinion gear (P_2), which is meshed with the axle gear, rotates counterclockwise in order to move the truck to the right. This pinion gear (P_2) is ahead of the axle gear instead of trailing it as the case at the No. 1 axle. This relation causes reaction on the motor at the No. 2 axle to be opposite that at the No. 1 axle. Again the force applied at the pinion gear (P_2) is far off the center of the motor laterally. At this axle the weight of the motor must be lifted while the tipping action is taking place. When this tipping occurs, the pinion motor support bearing (A_2) and the spring suspension (C_2) are the fulcrums. The result is a load on the bottom half of the pinion end motor support bearing (A_2) and at the same time a load on the top half of the commutator motor support bearing (B_2).

To simplify the explanation, the outline of each motor can be imagined as the top of a three legged table where the motor support bearings, A and B, and the spring suspension, C, represent the three legs. Should we press

down on the table top at a position of the No. 1 axle pinion gear (P_1), the legs at positions (A_1) and (C_1) will receive the downward force and in turn tend to tip the table lifting the third leg represented by (B_1) off the floor. These are the same forces that load the top of the pinion motor support bearing (A_1) and the bottom of the commutator motor support bearing (B_1). This same idea can be applied to the No. 2 motor at axle.

The upper drawing in Fig. 2 shows the actual clearances in motor support bearings in the static position. In the lower drawing in Fig. 2 are shown the arrangement of clearances which are obtained when the motor is under load.

The up and down forces are shown by the clearances and the reason for uneven wear is indicated by the position of the axle.

From the Diesel Maintainer's Note Book

In Which Trouble Indicates Other Trouble

It is difficult to fix the blame when the trouble is in one locomotive unit and the evidence of trouble in the other

He done it

By Gordon Taylor

This is a very unusual case. One of our crack passenger trains was delayed about four hours when engines on both units died and could not be re-started. The crew made every effort to restore service, but the cause of failure was so unusual and puzzling that their best efforts failed.

What happened was that because of a shortage of power, it was necessary to dispatch a Type E-8 passenger diesel unit in combination with a GP-7 unit. The E-8 was in lead, with the GP-7 trailing. The train left the home terminal on time, working perfectly. There was absolutely no indication of impending trouble.

At a point about 60 miles out, while traveling 50 to 55 miles per hour, the lights on the lead unit dimmed for a moment. At the same time a noise was heard in the engine room. The fireman entered the engine room to find the No. 1 engine running at slow speed, about to stop. He immediately isolated that engine, and hurried to the cab to check the ground relay. Just as he reached the cab, he heard the No. 2 engine slowing down and a few seconds later it had stopped.

The battle was then on to get the engines started. Since both engines had stopped, the crew thought naturally it must be for lack of fuel. They operated all of the circuit breakers and control switches which they thought might have caused the trouble, but got no results.

They did, however, note a lack of fuel in the fuel gage sight glass. That confirmed the crew's idea that shortage of fuel was the trouble. They decided to check the emergency fuel valve, which is located where the main fuel supply line connects with the fuel storage tank. They went to the passageway between engines No. 1 and No. 2, and raised up the floor plate to reach the reset device that opens the emergency fuel valve in case it had been tripped closed.

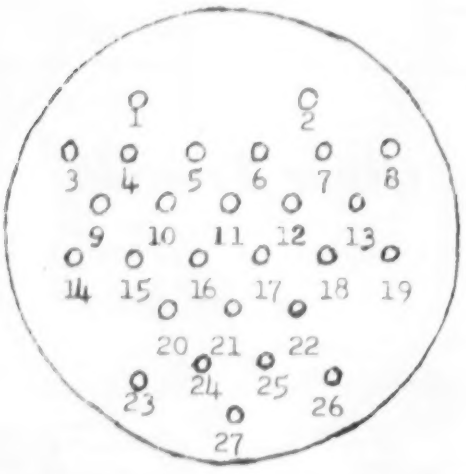
Since the position of the reset plunger did not show the crew clearly whether the emergency fuel valve was open or closed, the crew decided to pull one of the trip cables so as to definitely close the emergency valve. They would then push down on the reset plunger and know for certain that the fuel valve had been opened. The crew proceeded as described, but their efforts were foiled because of a

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

short length pull cable which fouled the reset mechanism, preventing the full opening of the fuel supply valve.

Now that the fuel supply was cut off from the engines on the lead unit, the crewmen turned their attention to the GP-7 trailing unit. Imagine their surprise when they found that engine had also stopped. They tried the usual method of starting that engine, but again without results.

The fireman then decided that the trailing unit trouble was caused by a defective jumper cable. He changed



Arrangement of receptacle contacts showing the relation between No. 4 and No. 9.

cables, but without results. He then removed the cable completely. Then he was able to start and operate the engine on the GP-7 unit. However, the one lone GP-7 unit was not enough to handle the train, and since a freight locomotive, with its train, had in the meantime come to the relief of the train, further efforts with the passenger units were discontinued.

The dead passenger units were placed on a siding and the freight locomotive proceeded with the passenger train. A relief crew brought out a second freight locomotive to power the freight train that had given up its locomotive. The relief crew, finding that the engine on GP-7 unit could be operated, used that unit to tow the dead E-8 unit back to the home terminal.

Inspection at the home terminal showed that the emergency fuel valve on the lead unit was in a partially open position, due to fouling of the reset mechanism, caused by misalignment of the reset rod and a short length pull cable.

Since the crew had closed the emergency fuel shut-off valve, it was clear that the fuel shut-off valve was not the original cause of the trouble. Even though the valve had been tripped originally on the lead unit, it was clear that it would not shut down the engine on the trailing unit. The trailing unit would be getting its fuel from its own fuel tank.

The next thing to be checked was the jumper cable receptacle on the GP-7 unit. Remember, its engine could not be started until the jumper cable had been completely removed from the receptacle. It was found that two contact pins in the receptable had split off and made contact with one another. Apparently the pins were not in contact with each other at all times. It had taken vibration and movement of the cable plug during its 60-mile trip to bring the contact pins together. One pin was *N-4*, the negative return wire for all other control wires. The other pin was No. *9*, which is the reverser wire connection for reverse operation.

You may, at this point, wonder that since the train was going forward, how the No. *9* wire could get into the picture.

Here is what happened. The No. *8* and No. *9* wires in all cable jumpers are crossed. In other words, a wire will connect at one end with a No. *9* wire contact, and at the other end with a No. *8* wire contact.

For this reason, the defective, or short circuit condition between the No. *9* and No. *4* wires in the receptacle on the trail unit, created a short circuit between the No. *8* and No. *4* wires on the lead unit. A short circuit between wires No. *8* and No. *4* set up a circuit on the lead unit that caused the following action.

The control circuit breaker on the lead unit opened. This cut off current supply to the *PC* wire. This is turn opened the *PC* relay, which caused the *FP* relay to open. The fuel pump circuit in the control unit feeds a fuel pump wire in the control system that extends through all units. This *FP* wire, when dead, shuts down fuel pumps in all units, and that is exactly what happened.

Had the crew thought to check the condition of the trailing unit when failure occurred, they would have saved themselves a lot of trouble. They would have known, for example, that the emergency fuel valve on the lead unit, was not causing trouble on the trail unit.

However, this case was so unusual that the crew had no reason to suspect that a case of trouble on a trailing unit was causing failure of the lead unit. Usually, jumper cable trouble causes trouble on trailing units, and not on lead units. In fact, this is the first case in our experience where jumper cable trouble in a trail unit has caused failure of the lead unit.

I can well understand how the crew was fooled in this case. When failure occurred, they had a locomotive full of trouble and they could not be blamed if they failed to go outside looking for more.

THERMALASTIC INSULATION, Westinghouse Electric Corporation's standard for a-c machines for the last three years, is now in vogue for d-c machines. It is expected that the new insulation will provide higher dielectric strength, longer voltage endurance, greater thermal stability, better heat conductivity, and complete isolation of electrical conductors from atmospheric contaminants.

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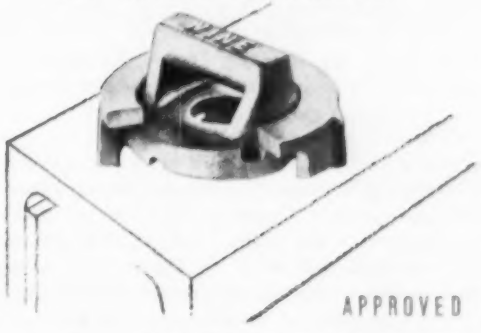
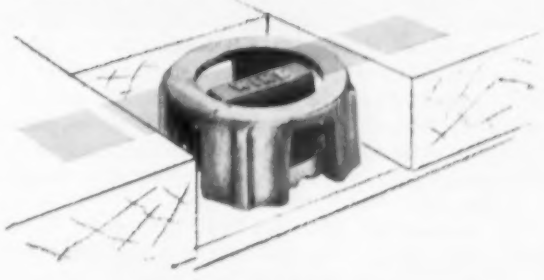


DROPS FLUSH WHEN NOT IN USE



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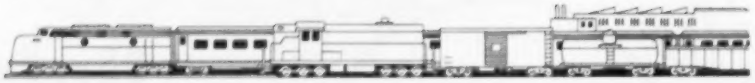
PROBLEM PAGE . . .



WHERE THE TOUGH ONES ARE HANDLED

A new question this month. Remember that it pays you to share your ideas and experiences with our readers. Submit letters to the Problem Page Editor.

Should the extent of a traction motor flashover determine whether it is cleaned up in place under the locomotive, or should the motor always be removed? If the practice of cleaning in place is used, what is looked for to determine if this will be done, and how can the locomotive be moved to rotate the armature and permit inspection and cleaning of the entire commutator?

Do Diesels Start Fires?

Can the responsibility for track-side fires ever be laid to diesel-electric locomotives?

NO DIESEL-CAUSED FIRES, *by National Park Service, Department of the Interior.* The National Park Service has not made any special studies of railroad fires, except in connection with its general fire prevention program. Furthermore, there is only a relatively short mileage of railroad right-of-way in and adjacent to areas protected by the National Park Service.

Our records indicate a decreasing number of fires classed as railroad fires. From 1940 through 1944—69 such fires were reported; 1945 to 1949—52 railroad fires were reported and from 1950 through 1954 only 35 such fires occurred. The great majority of these fires were not directly attributed to locomotives, although during the War when very heavy freight trains were operated, a number were obviously the result of sparks from steam locomotives. We do not have a specific report of a single fire caused by a diesel locomotive in areas administered by the National Park Service.

PRECEDENT ESTABLISHED, *by northern railroad.* In the early stages of railroad dieselization it was taken for granted that diesel-engined locomotives could not set fires. Even though sparks in varying quantities could be seen at night ejecting from diesel engine stacks, some sparks remaining incandescent until reaching the ground, it was accepted that such particles were not large enough to contain sufficient heat to start a fire.

This complacency was short-lived. After some claims finally were paid and the precedent thus established that diesel engines can set track-side fires, considerable study was made of the extent of the problem, the susceptibility of different diesel engines to emit sparks under various conditions, the source, nature and size of sparks, and the possibility of applying apparatus to check spark emission.

Sparks from engine stacks are not the only potential fire-producing source aboard a diesel locomotive, as it is possible for sparks to be thrown from brake shoes during heavy brake applications. On the other hand, it should be pointed out that heavy applications of the air brake are very rarely made on the locomotive itself, as the general air braking practice on American railroads is to hold the locomotive brakes off and let the train brakes apply during normal braking. Therefore if the diesel locomotive is suspected of setting a fire, and the possibility of lighted matches or tobacco as causes are ruled out, and no emergency brake application was made at the point in question, then suspicion may be attached to the engine itself.

The luminous sparks often seen at night issuing from a diesel engine stack when the engine is working hard are most frequently emitted when the throttle is advanced to eighth notch after a period of light load or idling. These sparks are neither ash nor soot, but are usually particles of the crusty layer of oxidized oil and fuel that deposits on piston heads, combustion chamber walls, and valve heads. It is desirable for this deposit to be dispersed in some manner rather than to build up and affect engine performance, but when the deposit does break up or spall off, the resultant particles may have both size and temperature sufficient to cause a glowing spark.

In a turbo-supercharged engine where the exhaust must pass through the turbine blades the possibility of spark particles retaining sufficient heat and size to cause a fire is exceedingly remote, in fact, fire claims have been justifiably denied simply on the grounds that the engine suspected was equipped with a turbocharger. With blower-equipped 2-cycle engines the situation is a little different, but the possibility of setting fires is still remote, particularly where the engine has the long exhaust passages built into some recent models.

Numerous suggestions have been made for screens to be placed over engine exhaust stacks to retain sparks, and many applications of various designs have been made. Too fine a screen, however, will cause an undesirable back-pressure on the engine combustion system, and too coarse a screen will allow the sparks to blow through. In any event, screens are not favored because they would not allow a piece of broken valve or piston ring or turbine blade to be ejected from the stack, although it must be admitted that a red-hot portion of broken valve blown out to the ground is classifiable as a fire hazard.

When a diesel locomotive is implicated in a track-side fire the factors involving the diesel engine, therefore, include the make and model of engine, the throttle notch at the time the locomotive passed the scene of the fire, the length of time following the previous movement of the throttle, the engine performance, and the record of inspection at the end of the run in question as well as the run

(Continued on page 86)

6-SL Brake Equipment

This is a new series of Questions and Answers pertaining to the 6-SL air brake equipment for switching locomotives. The references to the pamphlet, page and part numbers in the text indicates where the original material may be found in the manufacturer's technical publications and instruction pamphlets. Authorized persons may obtain a copy of Instruction Pamphlet Number 5046-15 which deals with this equipment by applying to the nearest district office of the Westinghouse Air Brake Company.

Dead Engine Feature Fig. 24

W108-Q—What comprises the dead engine feature on the 6-SL Brake Equipment?
A—A combined strainer and check valve plus a cut out cock used in the operation of locomotive brakes when the compressors on a locomotive in a train are inoperative.

Pipe Fixtures

(Inst. 5406-15, Pages 71, 72, 33, 34 and 35)

W109-Q—Where is the branch pipe tee (*Fig. 25*) located and how does it function?
A—Located in the distributing valve branch of the brake pipe, its purpose is to prevent moisture that may be deposited in the brake pipe from draining into the branch pipe connection and thence into the distributing valve.

W110-Q—What type of main reservoir cut out cock is used and how does it function?
A—The main reservoir cut out cock (*Fig. 26*) is to cut off and vent the air from the main reservoir pipe when removing the brake valve and feed valve.

W111-Q—What should be done before the cock is closed?
A—The brake valve cock should be closed and brake valve handle placed in emergency position. This is to prevent the slide valve of the feed valve and the rotary valve of the brake valve being lifted from their seats.

W112-Q—What other important cut-out cocks are used with this brake equipment?
A—Cut out cocks are placed in the brake cylinder piping for cutting out the cylinders if necessary. One is also placed in the branch pipe between the distributing valve and main reservoir.

Emergency Relay Valve

W113-Q—What is the purpose of emergency relay valve?
A—This device (*Fig. 29*), when properly connected to the brake pipe and brake valve, enables the engineman to obtain an emergency rate of brake pipe reduction from the brake valve under all conditions of service regardless of the position of the brake valve cut out cock or the K-3 rotair Valve.

W114-Q—Describe the emergency relay valve.
A—The emergency relay valve consists of a cast iron body with a brass slip bushing (vent valve cage) held in place by the body cover. A piston with a piston valve (vent valve) is attached to the opposite end of the piston stem and held in place by a castle nut. The valve is fitted with a WABCO seal which is normally seated, preventing escape of brake pipe air in the spring chamber to atmosphere.

K. M. Vent Valve

W115-Q—What is the function of the K.M. vent valve?
A—The K.M. vent valve provides a means of insuring propagation of quick action through a train when the brake pipe is vented to make an emergency application.

W116-Q—Describe this valve.
A—This valve (*Fig. 31*), consists of an upper housing *2* which is bolted to a bracket and a lower case *3* which is bolted to the bottom of the housing, supporting a slip bushing in which moves a piston. The piston shank is guided by an extension on the lower end of the bushing. Bushing *5* is formed with a seat on which gasket *11* on underside of piston seals when the pressure differential across the piston becomes great enough.

W117-Q—What limits flow of air through the passage used for stabilizing and also limits leakage past the ring?
A—Gasket *11* when it seals on its seat.

W118-Q—Describe the initial flow of brake pipe air through the K.M. vent valve during charging.
A—Brake pipe air, entering the vent valve (*Fig. 32*) flows through strainer *27* into chamber *A*, surrounding the discharge valves, and above piston *9*. The latter is moved downward until gasket *11* seals on its seat.

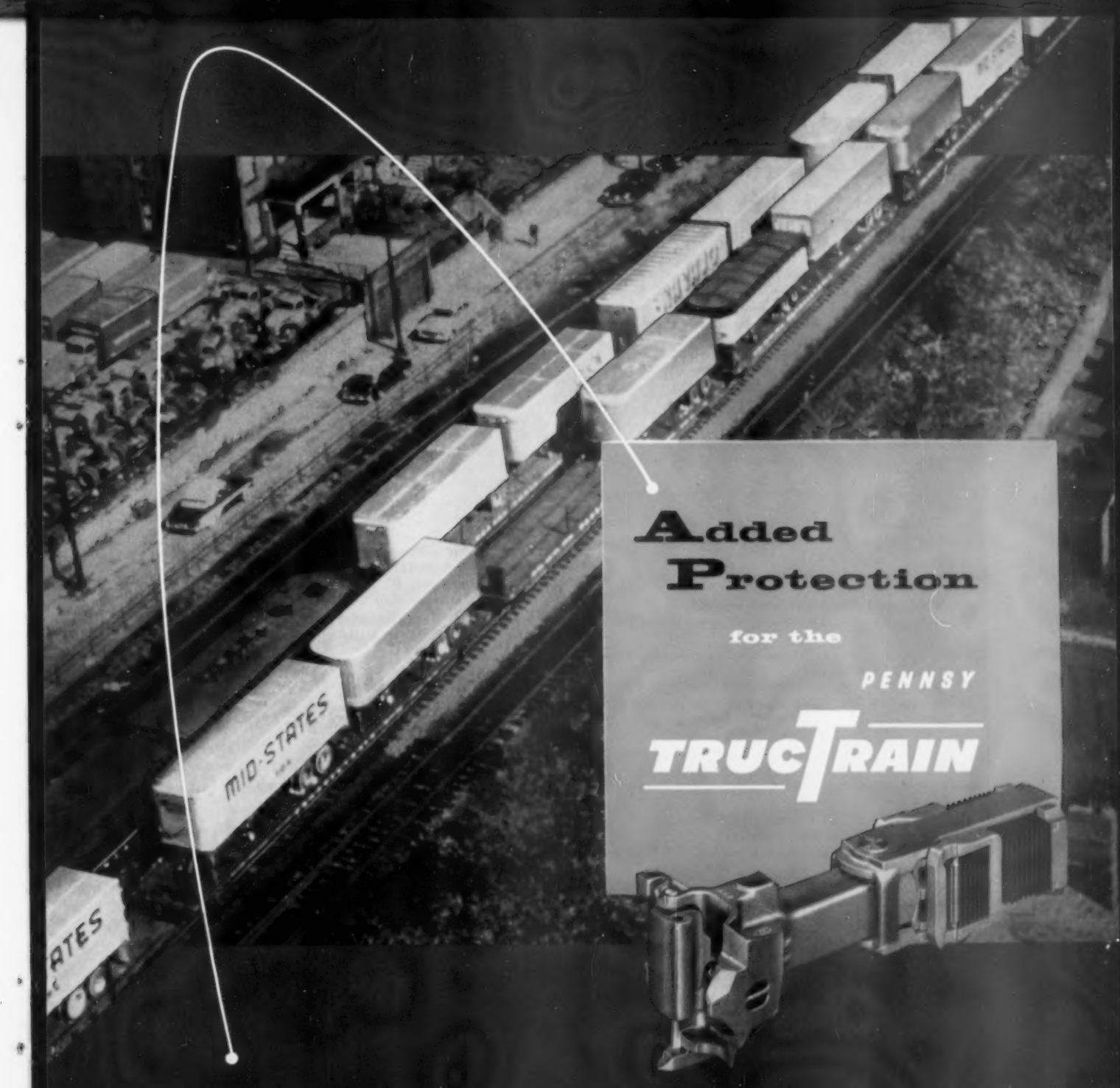
W119-Q—Describe the air flow further.
A—Air flows through stabilizing ports *a* and *b* into chamber *c* beneath the piston, charging it to brake pipe pressure at a slow enough rate to afford adequate protection against overcharge. Valves *24* and *21* are held tightly to their seats by the combined load of brake pipe pressure and spring *20*.

W120-Q—What initial operation takes place during a service application?
A—The reduction in brake pipe pressure during a service application is accompanied by a similar reduction of pressure in chambers *A* and *B*. This moves the piston upward to the position where the upper shoulders and pins *9a* engage valve *24*.

W121-Q—What prevents further movement of the piston?
A—Further movement is prevented by the load on this valve, resulting from the combination of brake pipe pressure acting on seat area and tension of spring *20*.

W122-Q—What prevents the development of a sufficient differential across the piston to unseat valve *24*?
A—So long as a service rate of brake pipe reduction is not materially exceeded, the capacity of the stabilizing ports is sufficient to allow pressure in chamber *C* to fall at approximately the same rate.

W123-Q—What is initial operation of K.M. Vent Valve when an emergency rate of brake pipe reduction occurs?
A—When an Emergency rate of brake pipe reduction occurs (*Fig. 33*), the capacity of stabilizing ports *a* and *b* is not sufficient to prevent a high differential pressure from quickly developing across piston *9*. Thus the piston moves up with ample force to unseat valve *24* against the spring *20* and brake pipe pressure on the seat area.



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QUESTIONS and ANSWERS

24-RL Brake Equipment

This is a new series of Questions and Answers pertaining to recent developments in the 24RL air brake equipment for road locomotives. The first questions will deal with the Pressure Maintaining feature. Authorized persons may obtain information on this subject in Instruction Pamphlets 2606-I, and 2601-I Supplement 1 by communicating with their nearest Westinghouse Air Brake representative.

R22-Q—Describe the arrangement of the brake valve cut-off valve assembly.
A—The arrangement consists of a three position lever, pilot valve and spring, and a cut-off piston and spring.

R23-Q—What are the positions of the brake valve cut-off valve?
A—*IN*—handle toward engineman, *MID*—handle straight up, and *OUT*—handle away from engineman.

R24-Q—What must be done when moving the handle from *OUT* to *IN* position?
A—Momentary hesitation must be made in *MID* position to avert a safety control application of the brakes.

R25-Q—Where is the first service valve assembly located and what is its function?
A—On the right side of the brake valve. Its function is the same as that of the conventional brake valve—to cut in or cut out first service feature.

R26-Q—Describe the first service valve arrangement.
A—The arrangement consists of a spool valve with "O" rings, a valve spring, two flat check valves, and a positioning handle.

R27-Q—Describe the handle positions.
A—*IN*—handle toward engineman, and *OUT*—handle away from engineman.

R28-Q—Describe the arrangement of the equalizing portion.
A—It consists of an equalizing piston fitted with a diaphragm instead of piston rings, a check valve type of equalizing discharge valve (exhaust valve) and spring, maintaining check valve and spring, equalizing reservoir check valve and spring, and a strainer and choke in the passage to the maintaining valve.

R29-Q—What advantage is derived from the use of a diaphragm instead of piston rings?
A—It is important that leakage from brake pipe to equalizing reservoir does not occur. The use of a diaphragm avoids any such possibility.

R30-Q—What is the function of the equalizing reservoir check valve?
A—To permit equalizing reservoir air to escape into the brake pipe and to atmosphere during an automatic emergency application.

R31-Q—What feature in the conventional brake valve does this feature displace?
A—The by-pass grooves in equalizing piston bushing.

R32-Q—What is the function of the interlock cut-off valve?
A—To actuate an automatic cut-off of pressure maintaining during penalty brake applications or train-initiated emergencies in which the service application portion is actuated.

R33-Q—What does the interlock cut-off valve consist of?
A—A spool piston with "O" and its spring.

Decription of DS-24-M Brake Valve

R34-Q—Is the rotary valve portion of the DS-24-M brake valve interchangeable?
A—No.

R35-Q—What operating portions are included in the service application portion of the DS-24-M brake valve?
A—An application piston fitted with a diaphragm in addition to packing rings and with slide valve and piston spring, brake pipe cut-off valve, and maintaining cut-off valve.

R36-Q—What additional function does the brake pipe cut-off valve perform?
A—It functions to actuate an automatic cut-off of pressure maintaining during penalty applications or train-initiated emergencies in which the service application portion is actuated.

Problem Page

Do Diesels Start Fires?

(Continued from page 84)

previous. Weather conditions, train speed, and wind direction also should be known, as well as the incidence of any brake applications at the scene. Unless any obviously unfavorable evidence shows as above listed there is no reason to suspect the locomotive of setting a track-side fire.

The establishment of precedent by actually paying claims for track-side fires involving diesel locomotives appears to have placed this motive power in much the same category as the steam locomotive, at least in those localities where a track-side fire occurring following the passage of a train was held to be the responsibility of the railway company unless the company could prove otherwise. Without doubt this custom has militated unfairly against the railroads in the past and may possibly do so in the future.

The reassuring element in this picture is that instances of track-side fires resulting in claims are now relatively few. But in a case where a track-side fire is seen to develop coincident with the passage of a diesel locomotive, and any mechanical or operating condition of the locomotive is such as to warrant the suspicion of sparks being emitted of a size and heat sufficient to cause fire under the existing conditions, then it is certainly possible for the diesel locomotive to be considered responsible. It would be only fair, however, to remove the burden of proof from the railway company in instances involving diesel locomotives.

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USS National Seamless Boiler Tubes can attribute their outstanding record for dependability and long life to the unique method by which they are made, *the piercing process.*

Only the soundest, most uniform steel will withstand the rigorous piercing operation. No other tube-making process so drastically tests the quality of the steel or, what is equally important, so completely removes all uncertainty regarding uniform wall strength. Every National Seamless Tube is a continuous piece of steel, offering the safety, security and dependability of a solid steel forging.

All steels used in National Seamless Boiler tubes are of the "killed" type—thoroughly deoxidized before being cast into ingots. This results in better heat transfer characteristics and higher creep strength at elevated temperatures. Moreover, improved methods of processing insure the right balance between strength and ductility to permit the utmost ease of installation. Our distributors bend boiler tubes. We will be glad to furnish the name of the distributor in your territory, upon request.

SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS **NATIONAL Seamless BOILER TUBES**

SEAMLESS WITHOUT WELDS

UNITED STATES STEEL

EQUIPMENT . . NEW IDEAS . . NEW USES

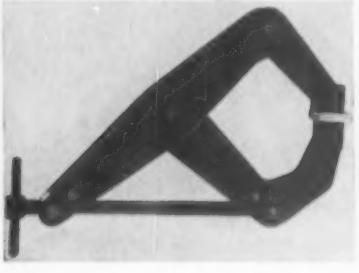
(Continued from page 12)

Power Rectifier

Occupying a volume of 190 cu. in., this compact 30 kw liquid cooled Germanium power rectifier has been designed for ac to dc conversion where high power output, high efficiency, negligible aging and small unit size is required.

The unit may be connected as a three-phase half wave device, for a six-phase star operation, three-phase center tap, or as a dual three-phase half wave unit to be used with interphase transformers. Depending on the circuit, output currents of 540 to 750 amps can be obtained. The assemblies can be supplied for input voltages of 26 volt to 66 volt rms maximum.

Cooling is supplied, using a liquid coolant such as water, oil, etc., at a maximum inlet temperature of 30 deg C and a volume of 1 to 4 gal per minute. The unit is applicable for all load requirements except those requiring heavy surge currents and those subject to heavy intermittent overloads or occasional short circuits. Unlimited operation life is said to be expected over a temperature range of minus 55 deg C to plus 75 deg C maximum. *Product Information Department, International Rectifier Corporation, Dept RLC, 1521 East Grand avenue, El segundo, Cal.*



Heavy-Duty Clamp

The jaws of this 9-in. Kant-Twist heavy-duty clamp are each grooved on one face and serrated on the opposite face. Trunnions and jaws are case hardened and the side plates are fabricated from high-tensile steel. *Saxton Manufacturing Co., Dept. RLC, 1517 North Poterno, El Monte, Cal.*

Brazing Flux

This flux has been produced to meet the need for high-temperature brazing of chrome and nickel alloys. Stainless-steel assemblies are particularly good applications for the flux, according to the manufacturer. The flux is free flowing and active in a temperature range of 1,400 to 2,000 deg F. *Air Reduction Sales Company, Division of Air Reduction Company, Dept. RLC. 60 East 42 Street, New York, 17, N.Y.*

Nuts and Torque Washers

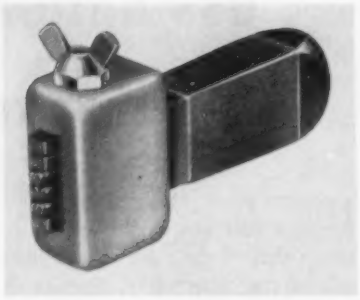
Ace Kwik Nuts and Ace Torque Washers have been introduced for use in pallets, pallet bins, skids, crates, boxes, trusses, and other industrial wood items or composition materials. The nuts are a combination nut-and-washer fastener and have been designed for high-speed applications. Only one drilling operation is required with no counterboring.

The torque washers are designed and constructed to prevent turning of carriage bolt in any operation. Its prongs are deeply embedded in the wood. The fasteners are installed by using an angle-hand allen wrench, straight power-type allen wrench, or a power spanner wrench. *Frank L. Robinson Company, Ace Fastener Division, Dept. RLC, Latham Square Bldg., Oakland 12, Cal.*

Protective Fabric

Herculite is a combination of nylon and special plastic. According to the manufacturer, the product is ten times stronger than conventional canvas. It will not support combustion, is 100 per cent waterproof, is unaffected by acids, grease, oil, salt water and weather conditions.

Said to handle like silk, yet is as strong as steel mesh. Because the product is light in weight, only one man, instead of two or three can be used to pull covers on and off cargo transportation units. *Herculite Protective Fabrics, Dept. RLC, 140 Little street, Belleville 9, N. J.*



Marking Type Holder

The Model HTS Mecco Safety Type Holder was developed for a marking operation in which stamps had to be changed quickly after one or two impressions. It is equipped with a thumb screw spring plunger which can be opened and closed quickly. Spring tension on the plunger pressing against type inserts holds type securely in place.

The device, of steel, includes a patented wedge grip design. It can be made for most any size of character or any capacity. One piece body construction provides maximum strength. The holder is recommended for marking operations requiring quick change of type such as serial numbering or odd lot marking. *M. E. Cunningham Company, 1075 Chateau street, Pittsburgh 33.*

High Voltage Splicing Tape

Using a butyl rubber base, this self-bonding tape, Scotch No. 23, is designed to meet the electrical and physical splicing needs of electricians making high voltage splices. It possesses a high dielectric strength of 650 volts per mil and provides excellent ozone resistance. It is intended for use as primary insulation on splices made on all insulated cables utilizing ozone resisting compounds.

After application, the tape fuses into a homogenous mass, yielding maximum moisture resistance. It cannot be removed without rupture and has no corrosive effect on copper or silver. The manufacturer recommends that the ¾-in. tape be necked down to ½ in. when wrapping to provide a good moisture seal and squeeze out possible air pockets. A 900 per cent elongation factor makes the tape's conformability excellent at cold temperature.

The product is elastic and tough, clean to apply and does not adhere to the fingers. It is compatible with overwrap tapes used to give extra physical protection to the splice. *Minnesota Mining & Manufacturing Co., Dept. RLC, Fauquier street, St. Paul 6.*

(Turn to page 92)

The best cranks have an even disposition . . . including our Mr. Searns

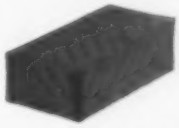
Since his first day as foreman of the O-P Crankshaft Machining Department, our Mr. Searns has been quite a crank—about crankshaft perfection. Through the years he has had a front-row seat in watching design improvements in the Fairbanks-Morse Opposed Piston engine.

One of the things our Mr. Searns is particular about is the accurate machining of the integral cast counterweights that reduce dynamic bearing loads . . . eliminate the problem of checking and maintaining attached counterweights in service.

Together with other advances in the O-P, this has eliminated "critical" bearings . . . reduced checking and maintenance.

As a matter of recorded fact, no comparable engine can equal the crankshaft, connecting rod and bearing life of the O-P.

This continuing research for better performance and longer life is an important part of Fairbanks-Morse's customer service and the basis for our constant product improvement—part by part. Fairbanks, Morse & Co., Chicago 5, Illinois.



Be sure you get the Dividend of Quality—specify genuine Fairbanks-Morse replacement parts. They are identified by the orange carton—and the Fairbanks-Morse Seal of Quality.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

DIESEL LOCOMOTIVES AND ENGINES • RAIL CARS AND RAILROAD EQUIPMENT • ELECTRICAL MACHINERY • PUMPS • SCALES • WATER SERVICE EQUIPMENT • MAGNETOS

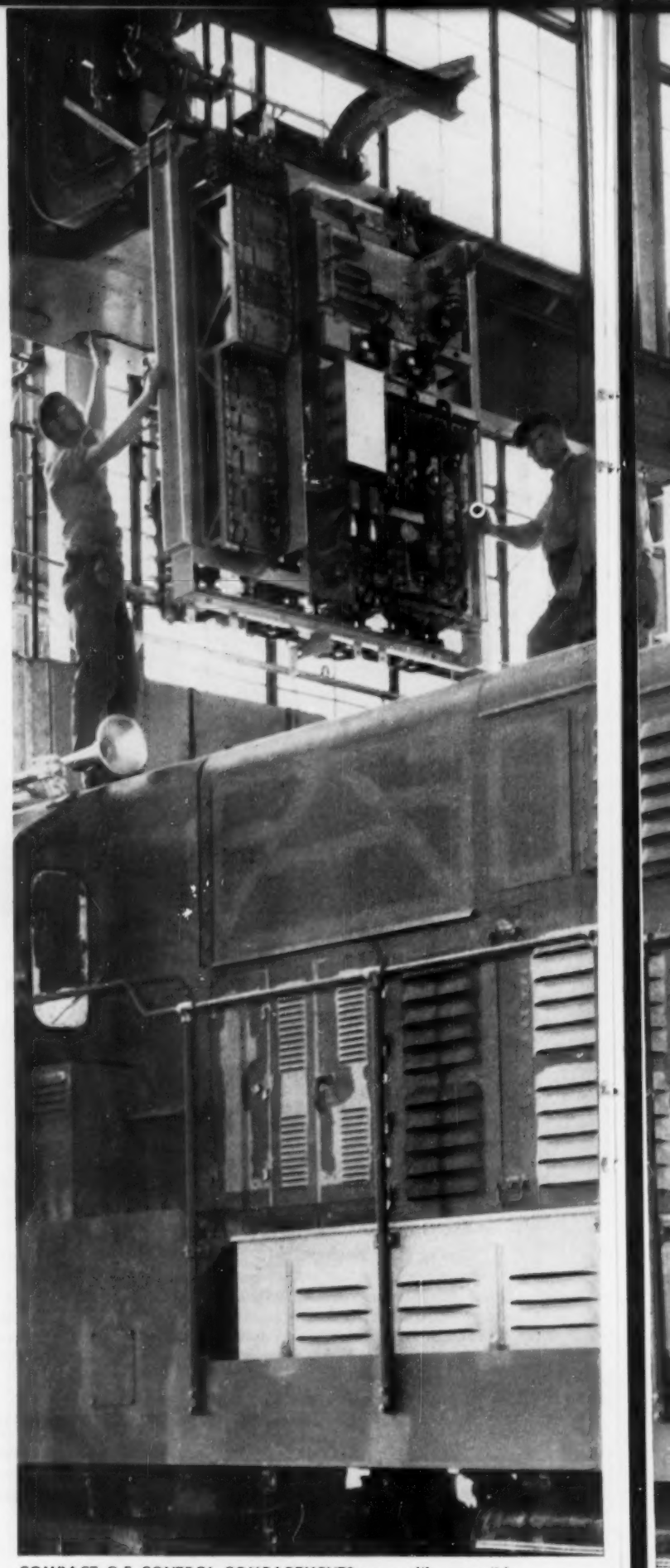
KEY TO RAILROAD PROGRESS . . .
ELECTRICAL PIONEERING

G.E.'s Static Excitation Control System for RR Locomotives Provides Smoother Locomotive Handling, Minimum Maintenance between Annual Inspections, and Greater Reliability

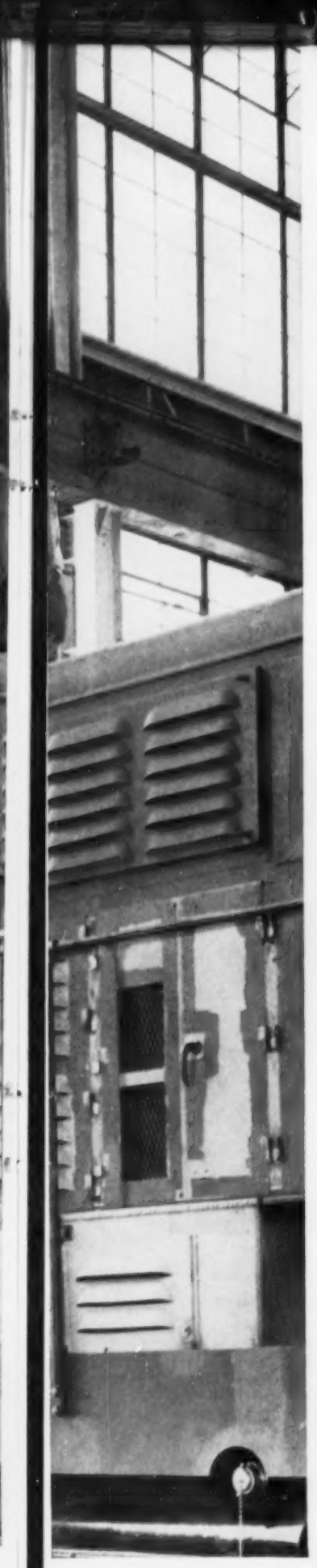
Ask your local G-E Apparatus sales representative for more information, or write Section 135-3, Locomotive and Car Equipment Department, Erie, Pa.

Progress Is Our Most Important Product

GENERAL ELECTRIC



COMPACT G-E CONTROL COMPARTMENTS are readily accessible with reduced number of control devices . . . smaller components.



GENERAL ELECTRIC

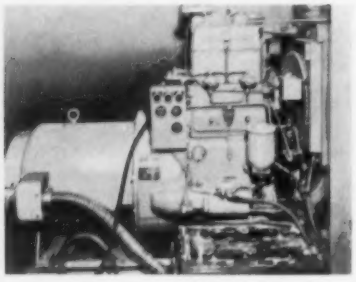
SIMPLIFIED BASIC CIRCUITS and fewer contacts within the circuits help G-E control give higher locomotive reliability.

G-E CONTROL helps assure smoother locomotive handling—provides 30% higher dynamic braking effort than other equipment.

MINIMUM MAINTENANCE is required between annual inspections because G-E control has fewer moving parts.

EQUIPMENT

(Continued from page 88)



Diesel Generator Sets

To secure adequate and uniform lighting, the Chicago, Milwaukee, St. Paul & Pacific recently installed these diesel generator sets on long suburban trains. The cars drew their power from the set and are independent of the generator in the locomotive.

The 2-cylinder diesel generator set produces 15 kw of 75-volt dc power which is sufficient to light 14 cars. Only one set is needed for each commuter train. The set, a switchboard and a 100-gal fuel tank, which is filled from the outside, are located in a compartment at one end of the car. The engine rests on shock-absorbing mounts that protect both the engine from shock and passengers from vibration. *Nordberg Manufacturing Company, Dept. RLC, Milwaukee 1.*

Dynamometer Checks Moving Wire Tension

Determination of tension in moving wires is no longer a problem to a Chicago electrical manufacturer. The solution is ingenious and can be duplicated in most any shop. Correct tension of the banding wire, which is dependent upon the size of the armature, had to be maintained in order to ensure that the coils would hold in exact alignment and to prevent breakage or imperfect banding. It was accom-

CONFUSED by too many Journal Box "Gadgets"?

There's a lot of shouting and drum-beating these days about journal bearing lubrication. What with all the pads, packs, pouches, and parcels it's no wonder railroad maintenance men are getting confused!

Let's face it: These gadgets could make life pretty complicated. Though being used in only about 10% of the boxes now, all these contrivances present problems when your road finds them in cars in interchange . . . "jack" some, not others . . . "hook" some, not others . . . turn some over, leave others as is. Pretty rough on the hired help.

The fact is that the new, more uniform thread packing which our Institute developed in cooperation with the AAR is used in 90% or more of the nation's freight rolling stock for journal bearing lubrication.

Thread Packing is the most satisfactory and least expensive way known to provide efficient bearing lubrication – and recent developments make it even better! The old problem of waste grab (generally resulting from poor packing preparation or careless maintenance) can be prevented by the use of an inexpensive, approved journal stop or retainer. And the new all-weather oil adopted by the AAR helps eliminate seasonal problems.

Members of our Institute have labored long and hard to improve thread packing. The Institute of Thread Machiners' Seal on bales of new packing now guarantees quality which meets or exceeds AAR specifications. Our member companies will be glad to offer help and advice on your packing problems. Let us know if we can help you.

INSTITUTE OF JOURNAL BOX PACKING MEMBER THREAD MACHINERS

INSTITUTE OF THREAD MACHINERS, INC.

141 East 44th Street, New York 17, New York

Atlas Processing Corp., New York, N. Y.
Meyer Borstein & Sons, Neenah, Wisconsin
Dallas Waste Mills, Dallas, Texas
The J. Milton Hagy Waste Works, Philadelphia, Pa.
John J. McGrath, Inc., Philadelphia, Pa.
Miller Waste Mills, Inc., Winona, Minn.
National Waste Company, New York, N. Y.
O'Neill Brothers, Inc., Philadelphia, Pa.
The Pittsburgh Waste Co., Inc., Swissvale, Pa.
Riverside Mills, Augusta, Ga.
Royal Manufacturing Company, Perth Amboy, N. J.
Southland Manufacturing Co., Inc., Norfolk, Va.
Twin City Textile Mills Waste Co., St. Paul, Minn.

plished by means of a Dillon traction type dynamometer and a shunt tensioning arm.

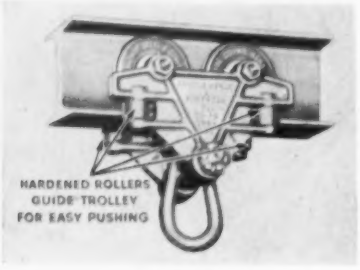
In actual operation, the moving wire passes over a lower and an upper pulley which are mounted to the tensioning arm. Midway between, the wire passes over a center pulley which in turn is connected to the indicating dynamometer. The outer pulleys act as guides for the wire. On a decreasing load, tension against the center pulley drops. Increased tension brings it up again. By watching the dynamometer readings, the operator is able to produce uniform work.

According to the manufacturer, the dynamometer is available in 13 capacities from as low as 0-500 lb up to 0-100,000 lb. It is equipped with a red maximum pointer and a manual reset while load is applied through shackles and pins. *W. C. Dillon & Co., Dept. RLC, 14620 Keswick street, Van Nuys, Cal.*

Vibration Meter

Type 1-128, an all-transistor vibration meter with a self-contained power source, can be carried and used anywhere to measure the amplitude of vibrations in the 10 to 1000 cps frequency range. It utilizes two 22½-volt dry batteries for power. The device is expected to be found useful in making flightline and railroad vibration tests, in troubleshooting machine tools, etc.

No vacuum tubes are used in the unit, four junction transistors make up the entire valve complement. It eliminates the warm-up time required for vacuum tubes. The carrying handle on the meter case can be pivoted to hold the instrument at a 30 deg angle. Consolidated self-generated pickups can be used with the meter to sense vibration, indicated directly on the dial as mils peak-to-peak displacement. *Consolidated Electrodynamics Corporation, Dept. RLC, 300 North Sierra Madre Villa, Pasadena, Cal.*



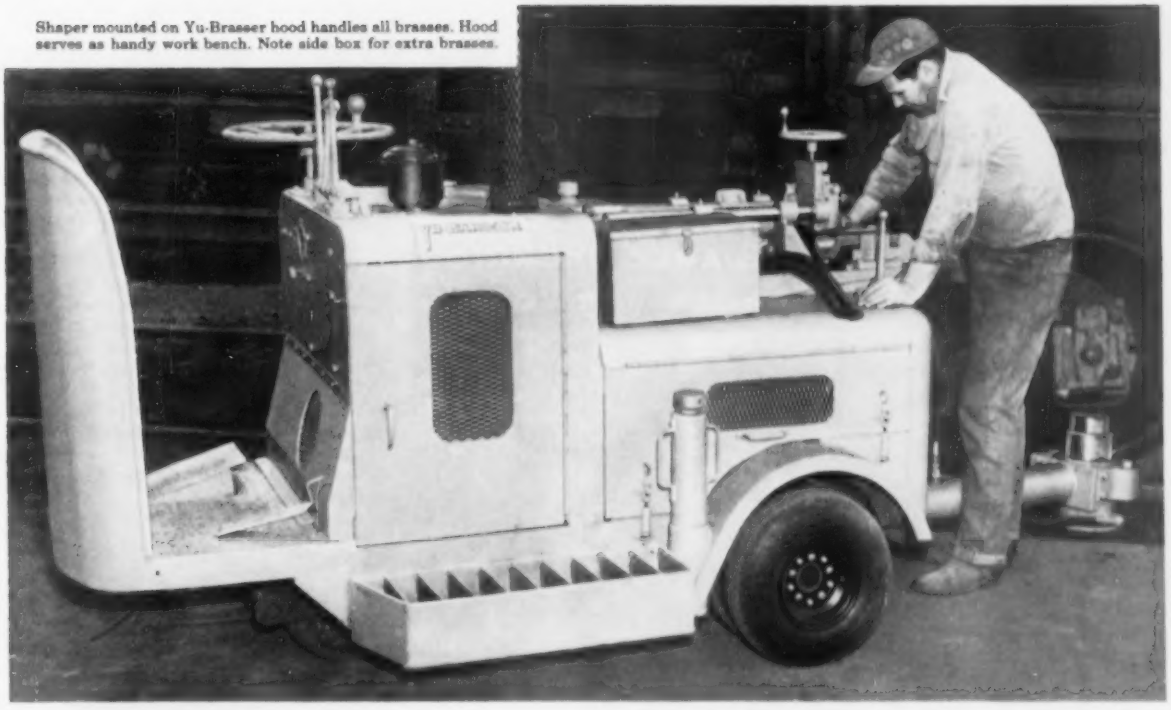
Trolley Hoist

This 4-wheel hoist trolley, of 1,000-lb hoisting capacity, has been designed for easy handling on straight or curved monorail systems. Ball-bearing trolley wheels and hardened guide rollers permit maximum loads to be easily pushed by hand. According to the manufacturer, these trolleys can be used with hoists, tool balancers, welding transformers, or for bridge crane end trucks. *Anchor Steel & Conveyor Co., Dept. RLC, 6906 Kingsley avenue, Dearborn, Mich.*

Synchronous Induction Motor

This unit is said to offer several advantages over existing types of synchronous reluctance motors and approaches the efficiency and power factor of squirrel-cage devices. It starts as an induction motor with a high locked rotor torque, accelerates and

Shaper mounted on Yu-Brasser hood handles all brasses. Hood serves as handy work bench. Note side box for extra brasses.



NEW!! Self-Propelled YU-BRASSER Combines Journal Jack, Brass Trimmer, Car Lift

Removing brasses is easy with Yu-Brasser – no wrestling with heavy hand jack. Keeps pace with new trends in box repacking.

Car lifting extension (with holding attachment), permits quick, easy inspection and greasing of side bearings and side plates.

Doubles cars you can service; prolongs brass life; quickly pays for itself; eliminates dangerous hand placing of jack.

Only Yu-Brasser offers you a complete mobile unit – hydraulically driven and operated–carrying its own hydraulic jack, trimmer, and car lift. With it one man removes and trims brasses, opens oil rolls and replaces brasses – on the spot, in 2 or 3 minutes! With jack extension, he can also lift car for inspection and greasing of side bearings and center plate.

Yu-Brasser Works Anywhere – Hydraulic jack swings right or left 54° so Yu-Brasser can work parallel with cars, important in cramped quarters. Jack adjusts to either paved or dirt surfaces; can be lowered below track, if necessary. It lifts journal boxes in 5 to 6 seconds, regardless of load.

Safe, Easy to Use – Operator controls spotting of jack and lifting from steering platform – no awkward, dangerous hand placement required. Safe, convenient on snow and ice. Spotlight facilitates night work.

Savings Proved – Nearly 2 year's constant use show Yu-Brasser easily pays for itself in substantially less than year. It *encourages* inspection of boxes on all cars, loaded as well as empty. Test period indicates significant reduction in hot boxes.

See for yourself how Yu-Brasser mechanizes car servicing, prolongs brass life, reduces costs and improves safety. Ask about our try-before-you-buy plan, or lease arrangements. For complete details, write, wire or telephone NOW to Earle C. Webster, National Sales Representative, 55 New Montgomery St., San Francisco 5, Calif. GArfield 1-7119.

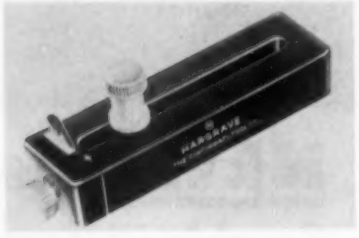
Manufactured by

Y 104 **YUBA MANUFACTURING CO.**
701 H Street, Benicia, California

pulls into synchronization quickly, and runs as a synchronous motor. The motor remains in synchronization regardless of load or line voltage fluctuations.

The Synduction motor, for general industrial use, is available in ratings from ¼ to 40 hp and is built on standard induction motor frames and enclosures and uses a simple die-cast rotor. It requires no brushes, slip rings or windings on the rotor, separate source of dc excitation, or special starting equipment as in the case of standard synchronous motors.

The unit has been designed to operate over a wide frequency, and therefore, a wide speed range. Frequencies of 300 cycles and speeds above 10,000 rpm are available. Motors for 10 cycles have been developed. They require only standard across-the-line starting equipment, except in the largest ratings, where reduced voltage starters are required. *Allis-Chalmers Manufacturing Company, Industries Group, Dept. RLC, Milwaukee 1.*



Gasket Cutters

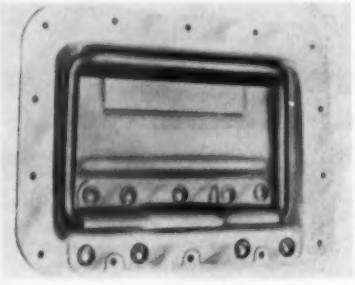
Two new gasket cutters are Model No. 414 Handy and the Model No. 415 Extension. The 414 device has a lightweight plastic body with steel blades and inch and metric scales. It can cut round gaskets ¾ in. to 6 in., odd shapes and straight pieces of any size, and is said to be ideal for cutting diaphragms, disks, patterns, shims, aluminum foil, etc.

The 415 unit has an aluminum body with steel blades and inch and metric scales. It can cut precision round gaskets of any size. Its sturdy extension arms increase cutting diameter to any size. Both tools are furnished with blue hammertone boxes. *Cincinnati Tool Company, Dept. RLC, Cincinnati 12.*

Portable Tank Ventilator

Cleaning and repairing railroad tank cars can be a difficult job if proper ventilating precautions are not taken. On many such jobs, motor-driven blowers are impractical because of their weight, bulk and inconvenience. Offered as a solution for the problem is a lightweight device which circulates maximum quantities of air yet has no moving parts. This M-S-A-Lamb Air-Mover is a venturi-type, portable air mover. It weighs only 31 lb but, when operated on only 60 psi air pressure will move as much as 2700 cu ft of air per min. Operation is based on the venturi effect

produced when compressed air is expanded at high velocity through an anular orifice and outlet horn. The device has no motors, turbines, fans, or moving parts of any kind. As for transporting the air mover, one man carries it from job to job. *Mine Safety Appliances Company, Dept. RLC, Pittsburgh.*



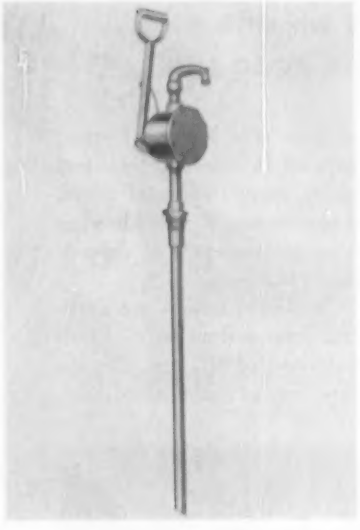
Recessed Handles

These lightweight snap-back recessed handles for use on instruments, dust covers, spare parts boxes, portable equipment, carrying and reusable shipping containers, combine the strength of steel with the lightness of aluminum. They meet clearance, environmental and physical test requirements of MIL-T-945A and MIL-T-4734.

A spring-loaded ball gives a flush and streamlined design to the case or equipment to which the handles are attached. They are available in three models—the SK-M-124A and SK-H-124A of steel construction for load capacities from 200 to 300 lb, and the smaller aluminum SK-M-T-300 for a 75 lb capacity. Unit weights of the large models are 0.786 and 1.2084 lb, and 0.312 lb for the small unit. *Skydyne Inc., Dept. RLC, River road, Port Jervis, N.Y.*

Piston-Type Hand Pump

This piston-type, positive-displacement, self-priming hand pump is said to deliver



20 gpm at lower cost per gallon than rotary vane-type hand pumps rated at 10 gpm. The pump, available as pump only, barrel pump, pedestal pump or with hose and nozzle delivery, is suitable for handling many industrial solvents, lubes, cutting or paint oils, soaps, waxes and maintenance liquids.

Features include stainless-steel replaceable liner, stainless steel shaft, aluminum body and piston, corrosion-resistant valves and molded plastic bearing, and built-in strainer. Fast disassembly permits easy cleaning or reversing direction of flow direction according to the maker. *Bowser, Inc., Dept. RLC, 1300 East Creighton avenue, Fort Wayne, Ind.*

Portable Rotary Compressor

With the addition of a 210 cu ft per min portable rotary compressor, this manufacturer has announced the availability of a complete line, including 125, 210, 315 and 600 cfm sizes. The compressor incorporates the same basic features, such as a new clutch, separate oil reservoir equipped with a pre-heater, etc., as the company's other units.

Small in size with high and rugged operating efficiency, general maintenance and inspection of parts have been simplified through easy accessability. A gravity-draining design of the cylinders prevents locking and the danger of oil accumulation. All types of standard mountings are available. *Worthington Corporation, Dept. RLC, Harrison, N.J.*

Tank Car Finish

A synthetic rubber resin base paint which is resistant to chemicals has been used in refinishing tank cars hauling high alkali solutions. The finish is based on Goodyear Pliolite S-5 and is said to resist high acid and salt exposure, and protect against dust and sand particle abrasion. First step in applying the paint was wire brushing to remove loose scale and rust. Surfaces were treated with Gay-Lux metal etcher and cleaner which is a phosphoric acid solution containing wetting agents. The cars were water rinsed, leaving a thin phosphate coating on the metal surfaces. A primer surfacer was then sprayed on the car. It contains sufficient zinc chromate to afford anti-corrosion properties. The finish coats containing the Pliolite S-5 were applied by spraying. *Kanartex Coatings, Inc., Dept. RLC, Galesburg, Ill.*

Electric Impact Wrench

The No. 56 SpeedWrench, a ½ in. square-drive universal impact tool, replaces the Model 55 unit. It is designed for fast nut-setting and removal and when used with its attachments it can also be used for drilling in wood, steel, stone and other materials, as a screw-driver, and for tapping, driving or removing studs.

The tool features one-hand operation through a finger-tip reverse button located in the handle. Single switch efficiency is made possible by concentration of all electrical connections in the handle. A molded rubber strain relief and anti-kink device is an addition.

The wrench is 9⅝ in. long, weighs 7 lb and has a 1⅞ in. offset. It develops forward and reverse speeds of 1900 rpm and delivers 1900 blows per minute. It is equipped with 15 ft of 3-conductor cable with 3-prong plug and adaptor with grounding wire. Standard models are rated at 115 volts. *Thor Power Tool Company, Dept. RLC, Aurora, Ill.*

Flat Head Studs

Three studs featuring flat heads, ¾ in. diameter, ⅛ in. thickness and thin shanks have been designed for construction or maintenance fastening jobs where studs should be comparatively flush with the surface. When used with the manufacturer's Model 455 stud driver, no extra washer or disc under the stud head is required.

One stud, 1-⅜ in. long, is used to fasten metal lath, metal ducts, and other light sheet metal to concrete, as well as masonry ties to concrete or blocks. Another, 2-⅛ in. long, is said to be ideal for furring strips to concrete or blocks. The third, 3-⅛ in.

Photo courtesy R. G. LeTourneau, Inc., Longview, Texas

Lifeguard for landing craft

This Landing Craft Retriever promises to save the Army Transportation Corps millions of dollars.

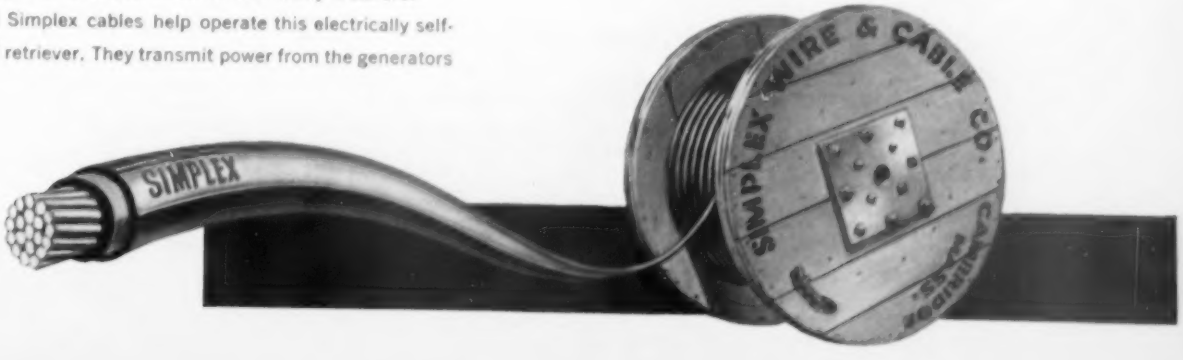
In World War II landings, enemy action accounted for only 10 per cent of the landing craft knocked out of service. The majority were sunk or grounded by rough seas, but could have been used again if there had been a fast, economical way to refloat them.

The Landing Craft Retriever developed by R. G. LeTourneau, Inc. is a practical answer to this giant salvage problem. Capable of straddling a 67-ton vessel, it can "right" the craft and transport it to deeper water or even carry it ashore.

Special Simplex cables help operate this electrically self-propelled retriever. They transmit power from the generators down to the four 10-ft. wheels, each of which has a separate built-in motor and gear reduction unit.

Simplex was chosen to make these vital cables because of its recognized ability to produce dependable cables and cords for specific needs.

Contact your Simplex representative about your problem today. Chances are, he can supply you with a standard or special cable that satisfies all your requirements. **SIMPLEX WIRE & CABLE CO.,** 79 Sidney Street, Cambridge 39, Mass.

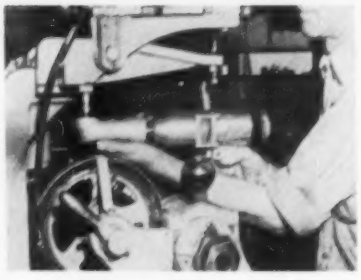


long, and is for fastening wooden two-by-fours to concrete and for shoring and form work. *Remington Arms Company, Dept. RLC, Bridgeport, Conn.*

Impact Wrench Right-Angle Attachment

Designed for equipment manufacturers, shops and factories whose operations involve comparatively inaccessible locations, this right-angle attachment, No. 568, fits any ½-in. air and electric-driven impact wrench.

According to the manufacturer, this contribution to fast nut-setting and removal comprises a heavy aluminum housing, alignment bushings, and locking pins. The spindles are built of tool steel and all gears of an alloy steel. The bearings are oil-sealed anti-friction type.



The attachment has a 29/32 in. spindle offset front, right and left to permit operators to move in close on tightly confined work. It is less than 6 in. long, has a head height of 2-¾ in., and weighs 2-½ lb. *Thor Power Tool Company, Dept. RLC, Aurora, Ill.*

Vacuum Cleaner

The Model No. 65 Heavy Duty vacuum cleaner features light weight, mobility and power. Equipped with a 1¼ hp universal motor, which is sealed against entrance of dirt or water, the device can remove up to 3¾ gallons of liquid or ⅞ bushels of dry material before emptying is necessary.

Two 8 in. rubber wheels and a caster in front permits easy rolling as well as stability when moving over rough floors. A locking device on the caster holds the machine stationary when desired. Its hose is made of flexible, static-proof Neoprene and is 15 ft long. The unit is equipped with a sturdy handle and is convenient for the operator to grasp when moving the cleaner.

The cleaner can be converted to a powerful blower by changing hose connections. Standard attachments include a hose swivel, 6 in. nozzle, 6 in. brush and crevice tool. It weighs 56 lb. *Black & Decker Manufacturing Co., Dept. RLC, Towson 4, Md.*

Drum Lift

This drum lift enables one man to handle 55- and 30-gallon steel drums, 18 to 23 in. diameter fibre drums and 13-gal. acid carboys. Of all-steel construction, the lift is rated at 750 lb capacity. Lifting power is supplied by a foot-operated hydraulic

Helps from Manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, please write direct to the manufacturer.

1. WELDING. 28-page colorful publication (Vol. 16, No. 1, 1956) "Airco in The News" contains numerous good technical and general interest stories including the World's First Welded Cable. (Write: *Air Reduction Co., Dept. RLC, 60 E. 42nd St., New York 17, N. Y.*)

2. STAINLESS STEELS. 10-page booklet "The Chromium-Nickel-Manganese Austenitic Stainless Steels" gives detailed information on stainless steels that use less nickel than previous series, and gives higher performance. (Write: *Adv. Dept., Allegheny Ludlum Steel Corp., Dept. RLC, 2020 Oliver Bldg., Pittsburgh 22, Pa.*)

3. SAFETY HOIST HOOK. Illustrated catalog "Close The Gate to Accidents" describes the new styles of Bullard-Burnham Safety Hooks; contains photos of hooks and connectors, and lists uses on hoists and cranes. (Write: *E. D. Bullard Co., Dept. RLC, 275 Eighth St., San Francisco 3, Calif.*)

4. CEMENTED CARBIDES. 66-page metalworking catalog (GT-310) "Carboloy Cemented Carbides For The Metal-Working Industry" describes, illustrates, gives specifications on line of Cemented Carbides; includes price data. (Write: *Carboloy, Dept. RLC, General Electric, Detroit 32*).

5. CHEMICALS. 4-page listing-order blank bulletin (Ch-3) gives up-to-date descriptions on all available C-M chemical bulletins; lists available literature in six categories. (Write: *Climax Molybdenum Co., Dept. L (RLC), 500 Fifth Ave., New York 36.*)

6. FILTER HOUSINGS. 4-page 3-hole punched catalog (MK-170) "Now, High Flow Micro-Klean Filter Housings" describes and illustrates features of newly engineered filter; includes specifications, flow rates, engineering drawings. (Write: *Cuno Engineering Corp., Dept. RLC, Public Relations Dept., Meriden, Conn.*)

7. CHUCK CONTROL. 4-page 2-color-3-hole punched brochure (53-20) describes and illustrates the Selectron completely automatic chuck control; pictures variety of installations; gives various capacity ranges. (Write: *DoAll Co., Dept. RLC, Des Plaines, Illinois.*)

8. WELDING PROCESSES. 16-page illustrated brochure (TIS 2367) "Picture Book of Facts on Eutectic's Welding Processes" gives helpful information on "Low Heat Input" metal-joining process; includes actual case histories. (Write: *Tech. Information Service, Eutectic Welding Alloys Corp., Dept. RLC, 40-40 172nd St., Flushing 58, N. Y.*)

9. FLANGE REDUCING TOOL. 4-page 2-color brochure "Proved Faster, Safer, Economical—The G & G Flange Reducing Tool" describes and illustrates with photos and diagrams the tool that reduces wheel flanges in one smooth operation. (Write: *G & G Tool & Mfg. Co., Dept. RLC, 424 Granby St., Hartford, Conn.*)

10. ELECTRIC PLANTS. 8-page manual (955) "Fermont Engineered Kilowatts" on kilowatt-producing machines, a new concept in field of electric plants; includes photos, reference material, forms, check lists, and typical specification. (Write: *International Fermont, Dept. RLC, Ramapo, N. Y.*)

11. CEMENTED CARBIDES. 56-page 3-hole punched catalog (56) "Kennametal Cemented Carbide Products" describes, illustrates, gives specifications on the Kennametal line of cemented carbides; includes prices. (Write: *Kennametal Inc., Dept. RLC, Latrobe, Pa.*)

12. FLOOR SURFACE HARDENER. 4-page 2-color brochure (SH 56) "Emer-Topcrete, The Floor Surface Hardener That Lasts Longer—By Actual Test" describes, illustrates, and gives recommended specifications on an easily applied, long lasting floor surface hardener. (Write: *Walter Maguire Co., Dept. RLC, 60 East 42nd St., New York 17, N. Y.*)

13. SYNTHETIC RESINS. 4-page 3-color 3-hole punched booklet (E-EPS) "Scotchcast Brand Resins, Synthetic Resin Products For Electrical Use" describes Scotchcast synthetic resins and includes examples of typical applications with data on flexibility, viscosity, pot life, cure times and available forms. (Write: *Minnesota Mining & Mfg. Co., Dept. D6-81 (RLC), 900 Fauquier St., St. Paul 6, Minn.*)

14. NUTS. 24-page Engineering Data Section illustrates and describes in 14 sections techniques in manufacture and proper installation of standard and special 12-pointer and hexagon nuts, Huglock and Marsden locknuts. (Write: *National Machine Products Co., Dept. RLC, 44225 Utica Road, Utica, Michigan.*)

15. D-C PORTABLE INSTRUMENT. 4-page folder "Sen-Dur Relay Protected Direct Current Portable Instrument" describes and illustrates the Model A (40 ranges) millivoltmeter, voltmeter, ammeter, milliammeter; includes price list. (Write: *Sen-Dur Manufacturing Co., Dept. RLC, 3225 North Sheffield Ave., Chicago*)

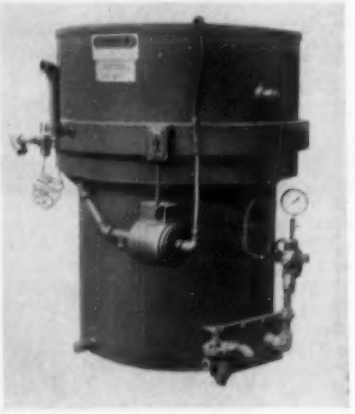
16. PEDESTAL GRINDER. 4-page 2-color catalog (5328) "For Better, Faster, Easier Grinding" describes, illustrates, gives specifications on the South Bend pedestal grinder. (Write: *South Bend Lathe Works, Dept. RLC, 425 E. Madison St., South Bend 22, Indiana.*)

17. RAILWAY EQUIPMENT. 28-page 3-color brochure "To Meet The Need" describes and illustrates Standard's improved facilities designed to meet diverse customer needs; points out flexibility of facilities; includes on-the-spot action photos. (Write: *Standard Railway Equipment Co., Dept. RLC, 310 S. Michigan Ave., Chicago 4.*)

18. BOILER FEED PUMPS. 2-page 3-hole punched bulletin (W-318-B23P) describes, illustrates, gives dimensions on 2-stage centrifugal boiler-feed pumps (types UNB and UB-12) with capacities to 2500 GPM, heads to 900 feet. (Write: *Adv. & Sales Prom. Dept., Worthington Corp., Dept. RLC, Harrison, N. J.*)

jack. It can raise drums to a pouring height of 53 in.

Oil, gas and spark-proof roller bearings of 4 in. diameter are normally supplied to move drums easily from one location to another. Spark-proof conducting casters of 8 in. diameter can be supplied on order. An easy-lock girdle, grips the drum firmly, can be attached in a matter of seconds and permits 360 deg drum rotation. Brakes on the drum-lift arms hold a drum at any angle. *Sterling, Fleischman Company, Dept. RLC, Broomall, Pa.*



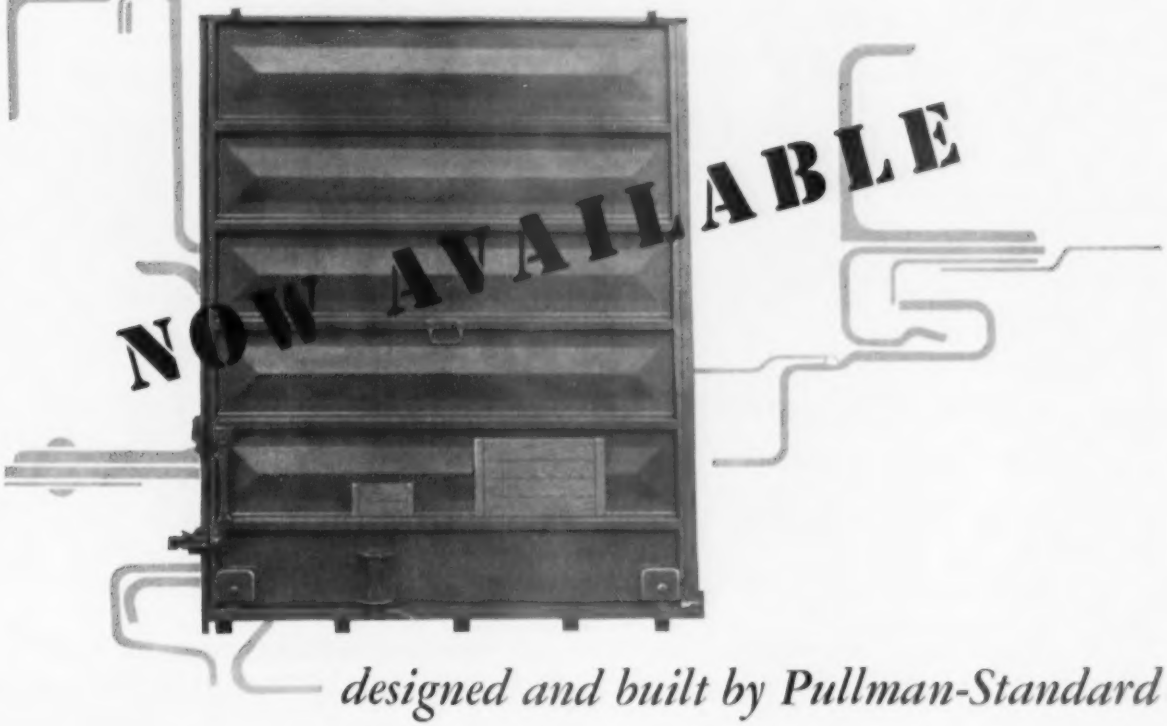
Vapor Spray Degreaser

This circular vapor spray degreaser, Model OP2-D30, is said to reduce floor space requirements, increase accessibility and simplify servicing. It has unobstructed tank walls with recessed condensate trough for solvent reclamation.

The interior of the tank, and other critical areas are zinc metallized for protection against corrosion. Stainless-steel-clad construction is also available. Pipe and fittings are galvanized. The degreaser has a sturdy work rest, a comfortable work height, and a removable cleanout door. All seams are electric welded and exteriors are painted with solvent resisting paint.

The unit is available with steam or electric heating systems and includes a liquid sump thermostat on the electric unit. *Circo Equipment Company, Dept. RLC, Terminal road and Central avenue, Rahway, N. J.*

BOX CAR SIDE DOORS



designed and built by Pullman-Standard

- **Design: by the world's largest car-builder . . . with fifteen years' experience in door manufacturing.**
- **Size: 9′ 11″ or specified height. 6′-7′-8′-9′ or specified width.**
- **Complete with fixtures and sub-parts, all to P-S design.**
- **Panels of .10-inch corrosion-resistant copper bearing steel. Lock, starter and bumper of cast steel. All parts weldable.**
- **5″ rollers in door roller assembly insure easy operation.**
- **Precision fabricated, embossed for strength, assembled by arc-welding.**
- **All around sealing arrangement excludes dirt and weather, safeguards lading.**
- **Self-protecting design and fabrication excellence mean long life, easy maintenance.**

Pullman-Standard has designed, built and laboratory and service tested a new box car side door, with integral fixtures, to fill the needs and specifications of the railroad industry. Offering maximum lading protection from dirt and weather, this new door is sealed all around by specially designed interlocking contours. The unit rolls smoothly and easily on large 5-inch diameter rollers with hardened roller bearings. The safety latch and door lock work as a unit. And the safety latch automatically locks the door in either the open or closed position after one car impact. The entire door and fixture unit is made for lasting service, durability and rugged strength.

After extensive field research to determine railroad and shipper requirements, prototypes of this door were designed, built and put into continuous laboratory and in-service tests three years ago. Every possible test was applied time and time again. The P-S Door withstood every abuse. Example: over 75,000 severe individual roller and bearing impacts were test-applied to prove the door roller assembly.

Completely confirmed as meeting the needs of the railroads, this new unit is now available for application on new PS-1 Box Cars. Already in service or on order for six railroads; Birmingham Southern, Duluth South Shore and Atlantic, Kansas City Southern, Monon, Rutland, Pittsburgh and West Virginia and the U. S. Army.

Replacement parts will be kept on hand by Pullman-Standard, and railroad orders will be filled immediately from inventory.

For full information on the new P-S Box Car Side Door, and how it can be applied to PS-1 Box Cars now on order, write for literature or contact the nearest Pullman-Standard sales office.

YOUR NEEDS CREATE THE PULLMAN "STANDARD"

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

79 EAST ADAMS STREET, CHICAGO 3, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

MAINTENANCE OF WORK EQUIPMENT is a must for accident-free, uninterrupted operations. A tiny crack can be a serious matter when it appears in a crane hook. To the naked eye it may appear to be only a scratch, yet it can open further and further under load. The end result: failure in service and subsequent costly damage. Photo above shows a Magnaflux indication of such a crack.

Case Studies: NONDESTRUCTIVE TESTING SYSTEMS

MAGNAFLUX-MAGNAGLO ON DIESELS checking a crankshaft at the Rock Island Maintenance Shops, Silvis, Illinois

Longer Service Life Assured by M Methods

"OFF THE ROAD" EQUIPMENT INSPECTION — The YM-5 is a 100% portable kit. It offers Magnaflux or Magnaglo inspection without need for any electrical connections. Adjustable permanent magnets in the yoke find all types of surface cracks in any magnetic material. Ideal for use in the shop or the field for inspecting rail, welds, and many parts of motor equipment and machinery of every type.

When "on the road" equipment is off the road for overhaul, repair or maintenance — fast, low cost, nondestructive M test equipment in your shop can be your assurance of full "availability" and longer service life.

Finding cracks in precision-made diesel parts requires precision testing equipment designed for the job. Magnaglo equipment is used by most major railroads to find *all* cracks in every working part of a diesel. Undetected cracks of this nature can mean road failure, high-cost unscheduled repairs and even more serious mishaps.

Magnaglo and Zyglo units for railroad inspection mark every crack with a glowing fluorescent line on the part itself. They positively detect any and all crack-type defects at lowest operating cost.

These test systems are recommended by railroad authorities as the "standard" accepted test for crack-type defects.

Magnaflux Corporation offers a wide variety of nondestructive testing methods for inspecting all types of "on" and "off" the road railroad equipment.

For detailed information regarding M applications for your specific inspection problems, call in one of our experienced Magnaflux engineers, or write today.

MAGNAGLO "HIGHBALLS" AXLE INSPECTION FOR LOWER COST

Inspect with Magnaglo and be sure that every axle that goes back into service is fit for service. Under Magnaglo black light, all cracks instantly appear right on the part itself as glowing indications, impossible to miss. Magnaglo is fast, low cost — and fully reliable.

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

Write for complete details concerning any of the above case studies, (excerpts from MAGNAFACTS), or ask for our new booklet on Lower Manufacturing Costs.

Take Your Inspection Problems to the House of Answers . . .

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SAVINGS BOND BUSINESS IS GOOD—

and Good for Business

1955 was a tremendous year for Savings Bonds.

Cash sales of Series E and Series H Bonds hit a ten year peak: $5,368,335,000; an increase of 10% over 1954 and 23% higher than 1953.

Sales of E and H Bonds exceeded total redemptions of both series (maturities and cashings) by $716,834,000; up 61% over 1954.

Sales of Series H Bonds—the current income bond sold only to individuals—exceeded $1 billion for the first time in any year since their introduction in mid-1952.

As of December 31, 1955, the cash value of E and H Bonds held by 40,000,000 individuals totaled more than $40 billion—the highest amount on record.

Between May, 1951, and December, 1955, Series E Bonds with a face value of $19.9 billion, had reached maturity. Of these, bondholders still held approximately 70%—$13.9 billion—under the optional automatic extension terms. The additional interest earned in their extended life increased the cash value of *matured* E Bonds outstanding December 31st to $14.6 billion.

During 1955, 8,000,000 employees (of 40,000 companies) invested $160,000,000 per *month* in U. S. Savings Bonds through the Payroll Savings Plan.

How many employees were added to *your* Payroll Savings Plan last year? What is the percentage of employee participation today? The average investment in Bonds per month per employee? If you don't know the answers to these questions, why not pick up the phone and get the figures?

If you find that less than 50% of your employees are enrolled in the plan . . . or if you do not have the Plan . . . phone, wire or write to Savings Bond Division, U. S. Treasury Department, Washington, 25. You'll be surprised to learn how easily you can install a Payroll Savings Plan or increase participation in an existing plan to 60%, 70% or higher.

Savings Bond Business is good—and good for business. Act today.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

RAILWAY LOCOMOTIVES and CARS

SPEED UP YOUR HANDLING

with Roebling

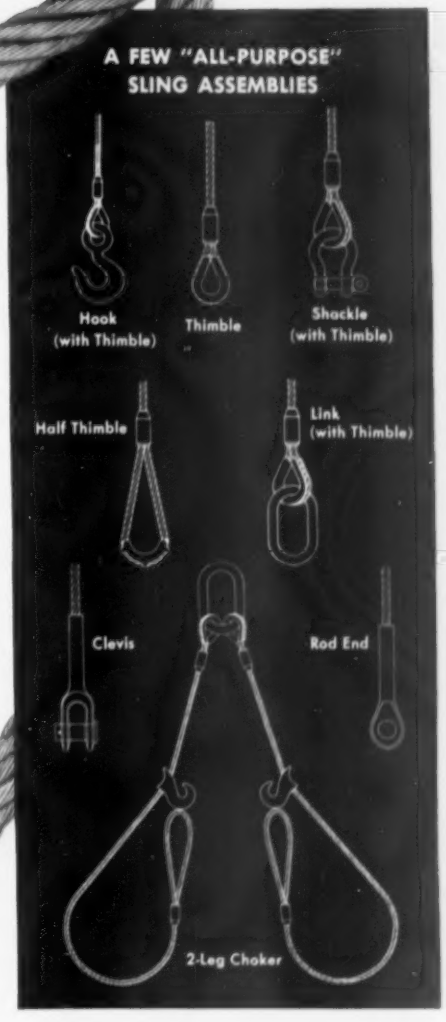
"ALL-PURPOSE"

Slings

WHEN YOU PUT "All-Purpose" Slings on the job it's like a shot in the arm. Materials move faster. Rassling with cranky loops and lines is abolished. Handling costs come down.

"All-Purpose" Slings are all-steel. Wire ends are permanently covered by the swaged tapered sleeve which develops the rated strength of the preformed wire rope itself.

Shown at the right are some of the many assemblies available for individual requirements. Write for descriptive folder and order "All-Purpose" Slings for new handling speed and economy.



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This simple device on your diesel or steam locomotive wheels . . .

. . . loaded with Nalco "Moly" Stick dry lubricant . . .

. . . gives you

- Better flange lubrication
- Lowered lubricating costs
- Longer wheel life
- Less lubricator maintenance
- No traction losses
- No track fouling

SIMPLICITY, plus low installation and upkeep costs for *really effective dry flange lubrication* are yours with Nalco "Moly" Stick Lubricators. This new concept in flange lubrication utilizes a molybdenum disulfide type lubricant which has high film strength under pressure and does not pick up dirt or other abrasives. Tests in service show that "Moly" Sticks provide better lubrication and far outwear any other type of stick lubricant.

Write for Bulletin 551 for more cost-saving data on Nalco Flange Lubricators—Or ask your Nalco Representative for details.

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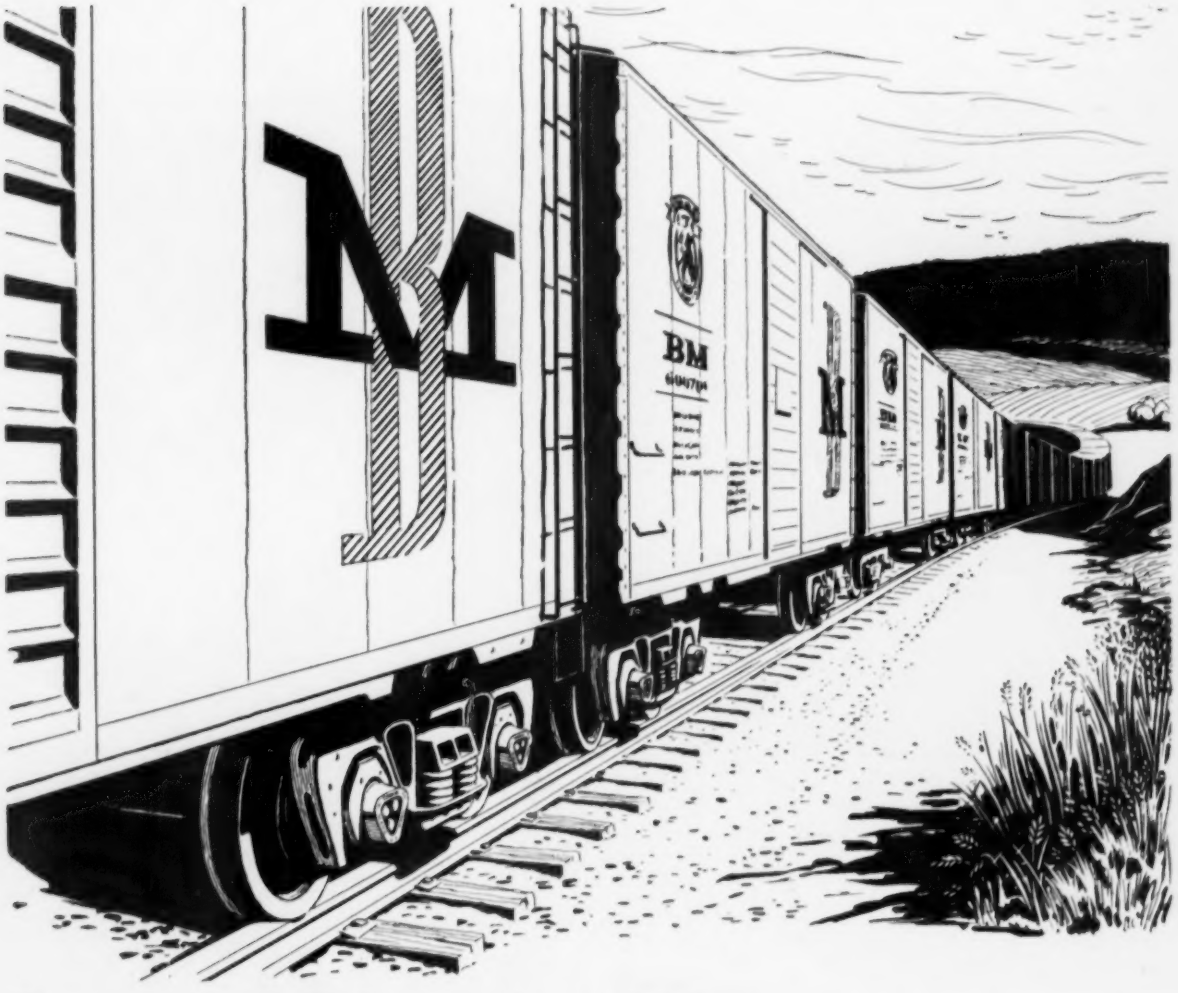


Boston and Maine orders 800 new "Roller Freight" box cars for interchange service

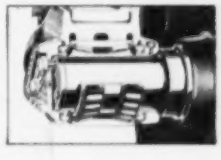
TO provide better service for its shippers, the Boston and Maine Railroad has ordered 800 new box cars equipped with Timken® tapered roller bearings instead of friction bearings.

"Roller Freight" cars will speed deliveries for Boston and Maine shippers by eliminating the hot box problem. And hot boxes are the major cause of freight train delays. Unlike cars with friction bearings, "Roller Freight" cars provide delay-free dependability that gets shipments where they're going on time.

But "Roller Freight" profits the railroads as well as their shippers. When they put roller bearings on all freight cars, they'll save on lubrication, labor, inspection and repairs. An estimated $190 million a year! A 22% annual return on the investment.

The taper makes Timken the only journal bearing that delivers all the advantages you expect to get from roller bearings. To insure its quality, we make our own steel. We're the only bearing maker that does.

Timken bearings not only end the hot box problem, they cut terminal bearing inspection time 90%. They need only one bearing inspection compared to nine for friction bearings. And Timken bearings can go three years without adding lubricant. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



TIMKEN

("TIMKEN" IS A REG. U.S. PAT. OFF.)

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